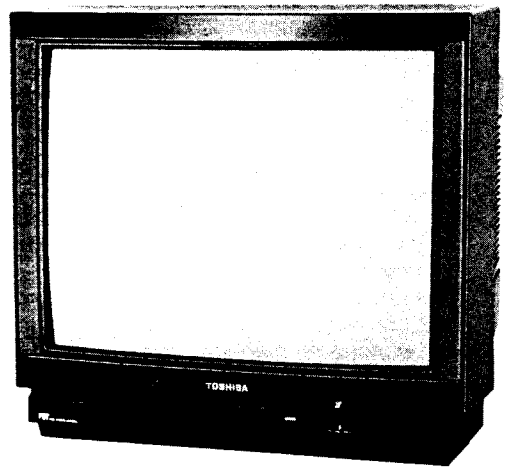
SERVICE DATA
FILE NO. 050-204
PAL-I SYSTEM

TOSHIBA
COLOUR TELEVISION
219R9B



SPECIFICATIONS

Power Input Rating :	95 watts, AC 240 volts, 50Hz
Aerial Input Impedance :	75 ohm unbalanced type for UHF
Receiving Channels :	UHF channels ..... channels 21 to 68
Intermediate Frequencies :	Picture I-F carrier frequency ..... 39.5 MHz Sound I-F carrier frequency ..... 33.5 MHz Colour sub-carrier frequency ..... 35.07 MHz
Picture Tube :	21 inches, A51EBV12X01, 510 mm (measured on diagonal of viewable picture area), 90° Deflection.
Sound Output :	3.0 watts (at 10% harmonic distortion), Max. 3.5 watts
Speaker :	Round 100 mm
Aux Terminal :	Earphone Socket
Cabinet :	Table type
Dimensions :	Height ..... 465 mm Width ..... 500 mm Depth ..... 476 mm
Weight :	22 kg

Specifications are subject to change without notice.

Printed in Japan Jun. 1989 (So)

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" , "SAFETY PRECAUTION" AND THE "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

X-RAY RADIATION PRECAUTION

1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 26.5 kV at zero beam current (minimum brightness) operating at 240V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 27.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure in this manual using an accurate E.H.T. voltmeter.
2. The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.
   For continued safety, replacement component should only be made after referring the Product Safety Notice below.

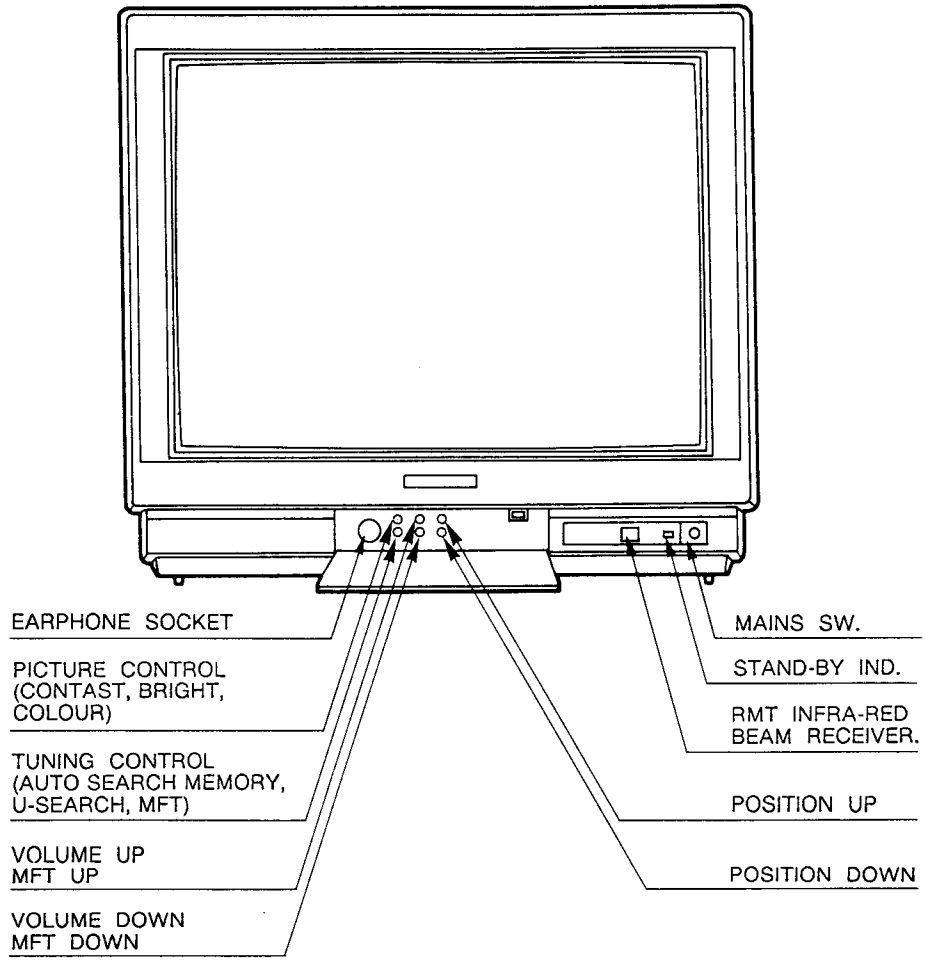
SAFETY PRECAUTION

1. This receiver has a nominal working E.H.T. voltage of 25.0 kV. Extreme caution should be exercised when working on the receiver with the back removed.
   Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.
   When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap
   The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling.
   Do not hold the C.R.T. by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
4. Replace blown fuses within the receiver with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

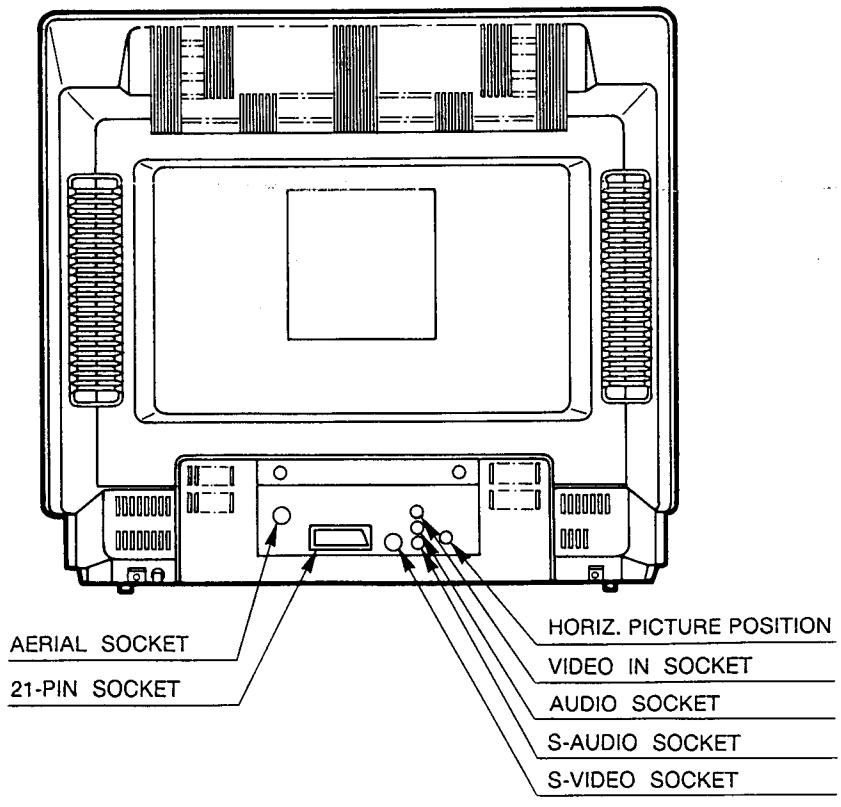
PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc.
Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

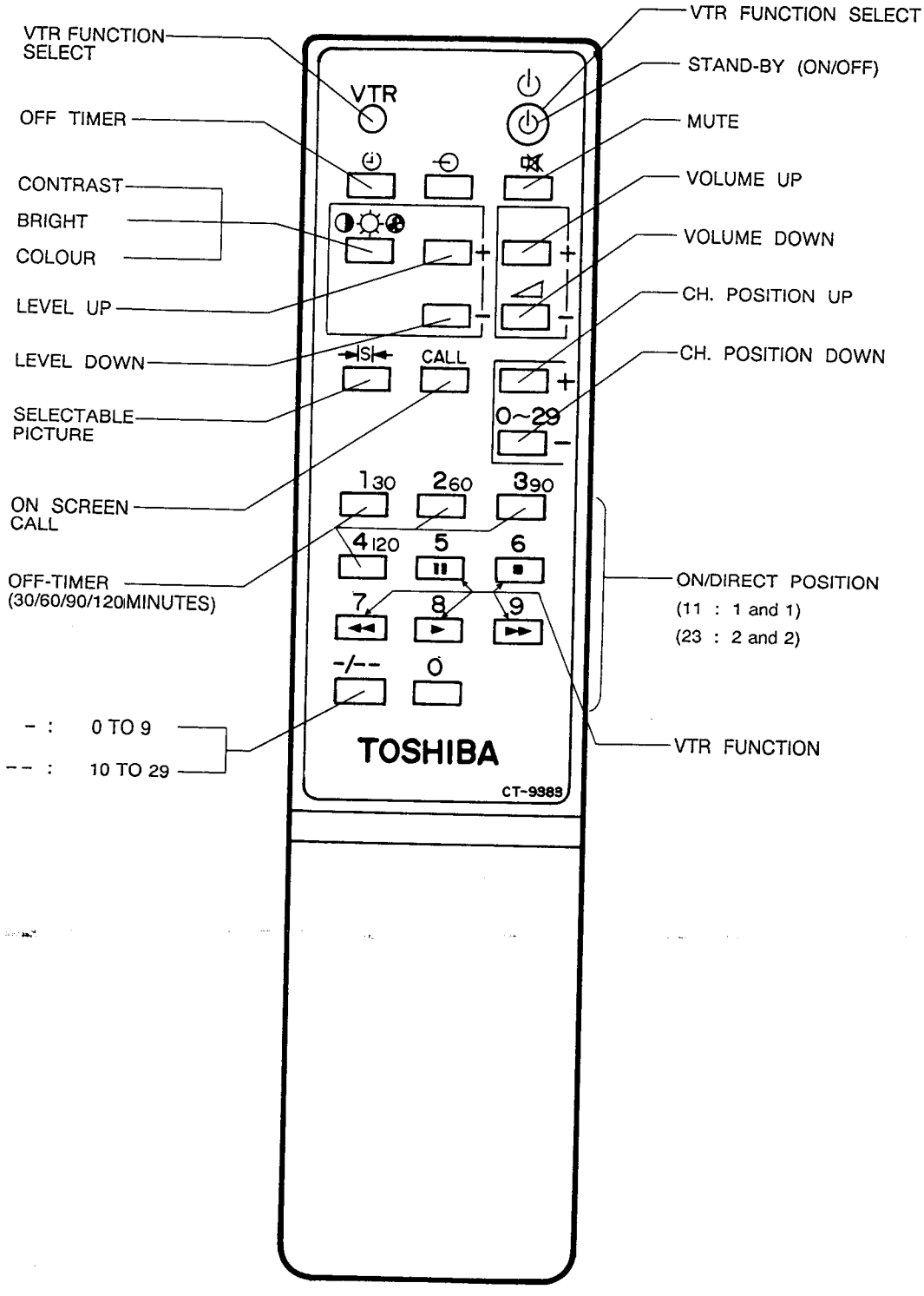
FRONT CONTROLS VIEW



REAR VIEW



REMOTE HAND HELD UNIT



WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

INSTALLATION AND SERVICE ADJUSTMENTS

GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.
This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.
Plug the power cord into a convenient 240 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source.

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 27.5 kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 27.5 kV under any conditions.

HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync., adjust the HORIZONTAL HOLD control (R451) to remove the condition. Adjust the HORIZONTAL HOLD to the centre of the pull-in range.

HORIZONTAL CENTRE ADJUSTMENT

1. Perform this adjustment after H. HOLD adjustment are completed.
2. Receive the UK PHILIPS pattern.
3. Set the contrast, brightness and colour to centre.
4. Adjust H. CENTRE Control (R453) so that pattern centre can be located at the screen centre.

HEIGHT ADJUSTMENT

1. Receive the UK PHILIPS pattern.
2. Set the contrast, brightness and colour to centre.
3. Change the VERT UP/DW SW (S301) so that the white flags on top and bottom of the pattern can be located at the screen centre.
4. Adjust HEIGHT Control (R352) so that the white flags on top and bottom of the pattern are just hidden.

PAL MATRIX ADJUSTMENT

1. Tune in the colour signal of Philips pattern.
2. Set the COLOUR control to obtain a proper colour.
3. Connect oscilloscope to pin 16 on Q501.
4. Short Pin 1 of W201 with a jumper wire to shut off video signal.
5. Adjust the 1H DL AMP control (R551) to coincide the ALT (B-Y) bar of Philips pattern.
6. Adjust the 1H DL PHASE conttrol (L551) to coincide the 75% colour bar of Philips pattern.

COLOUR SUB-CARRIER ADJUSTMENT

1. Tune in the colour signal of PHILIPS pattern.
2. Short the pins 21 and 22 of Q501 with a jumper wire.
3. Short the pin 6 of Q501 and Vcc (+12V) with a jumper wire.
4. Adjust CW control (C551) to gain at the Colour sync.
5. After completing PAL MATRIX Adjustment, repeat the step again.

CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Turn the SCREEN Control (on T461) fully counter-clockwise.
3. Set the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) counterclockwise to the minimum position.
4. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
5. Set the CUT OFF SW. (S201) in the H. line position.
6. Short temporarily terminal of RASTER CHIP on the CRT DRIVE Board.
7. Set the CONTRAST, COLOUR Controls to minimum and BRIGHTNESS Control to centre. Set the SUB BRIGHTNESS Control to minimum.
8. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen. Set the SCREEN Control to this position.
9. Open the terminal of RASTER CHIP on the CRT DRIVE Board.
10. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE).
    The lines may look like white if the CUT OFF Controls are adjusted properly.
11. Return the CUT OFF SW. (S201) in the receiving position.
12. Set the BRIGHTNESS Control to the maximum and COLOUR Control to the minimum.
13. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
14. Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

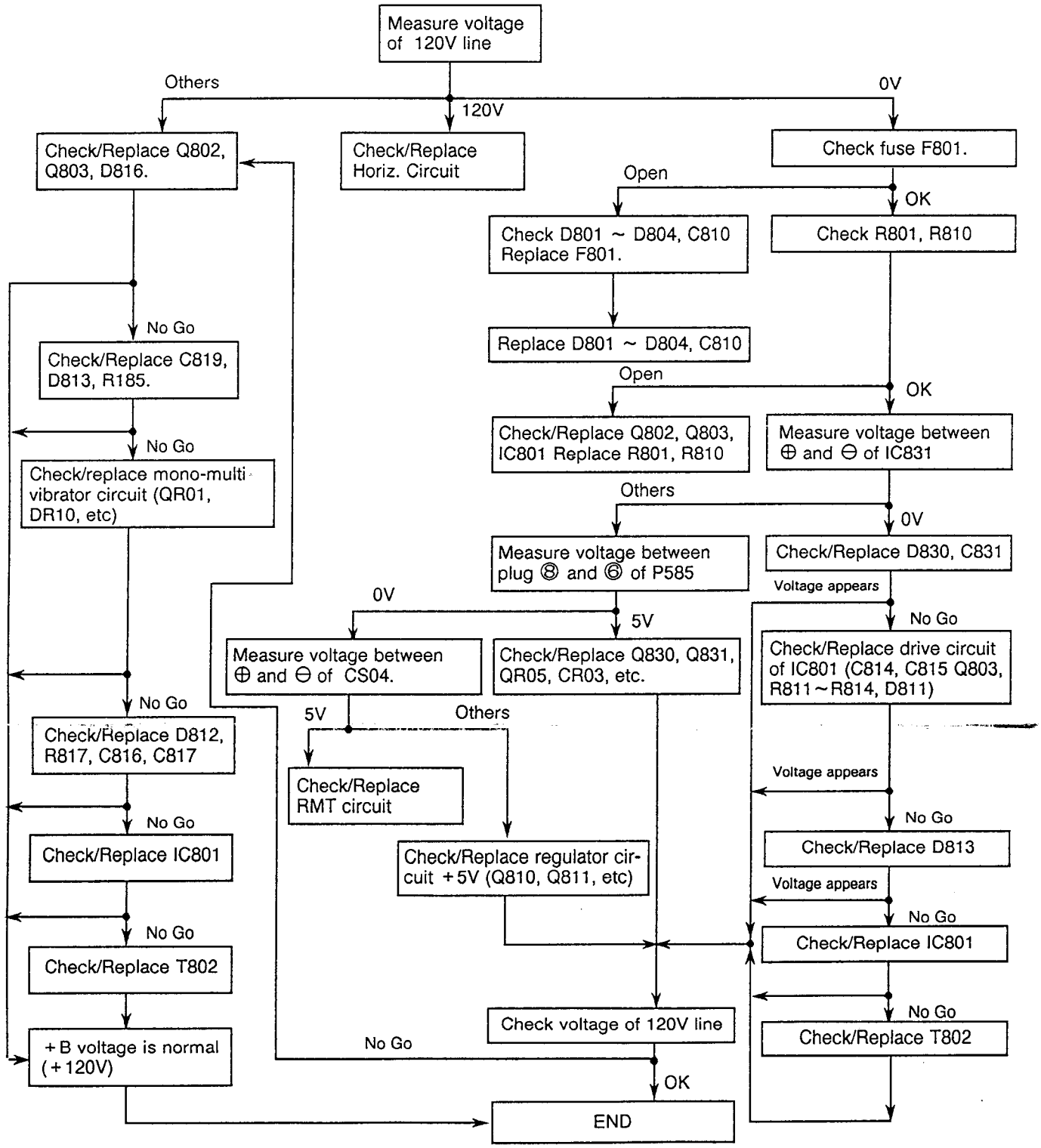
SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the CONTRAST Control to the minimum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the minimum.
4. Set the SUB BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

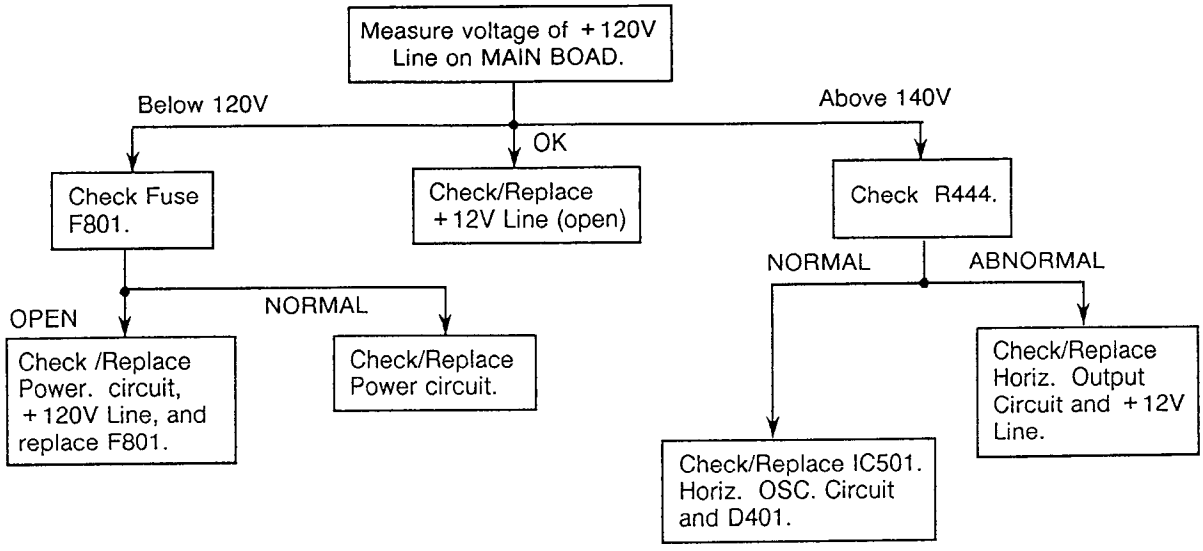
TROUBLESHOOTING CHARTS

The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.
In order to utilize the charts (fault trees), firstly establish the complaint, i.e. – No Raster, No Sound.
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

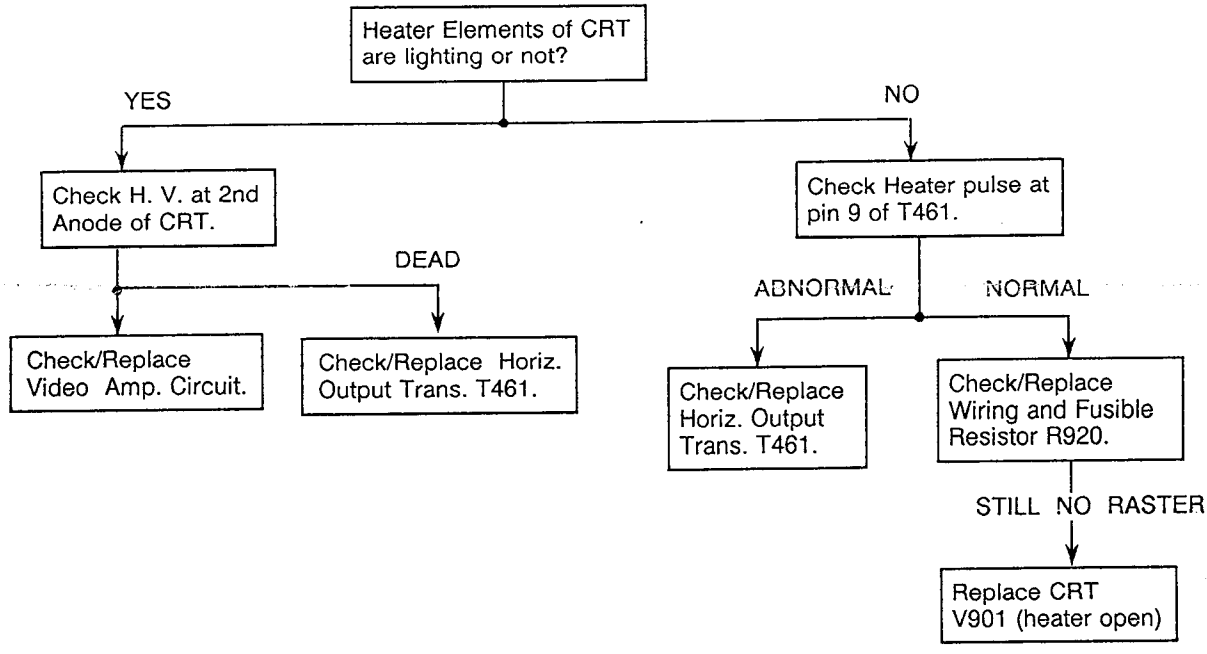
1. NO RASTER AND NO SOUND



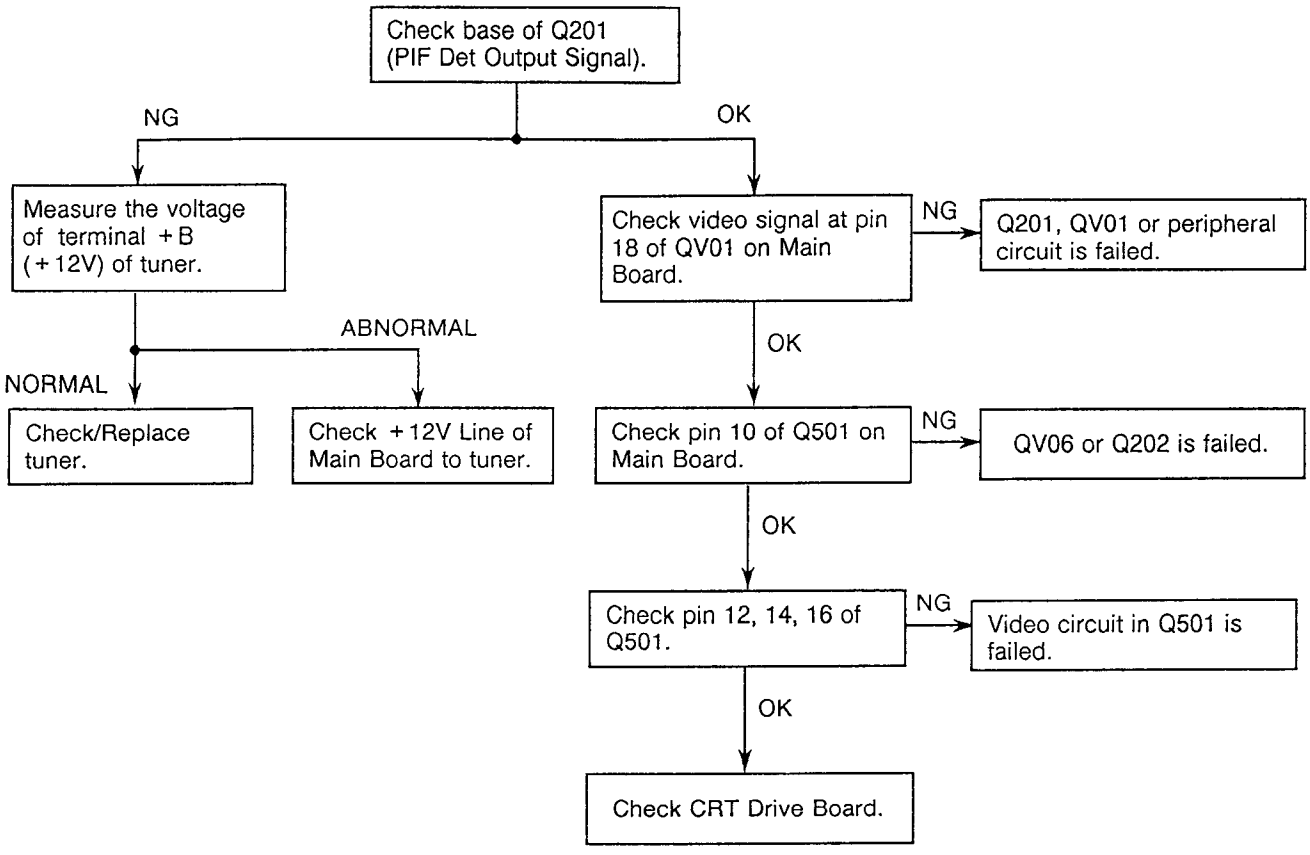
2. NO RASTER (NOISE OR WEAK SOUND)



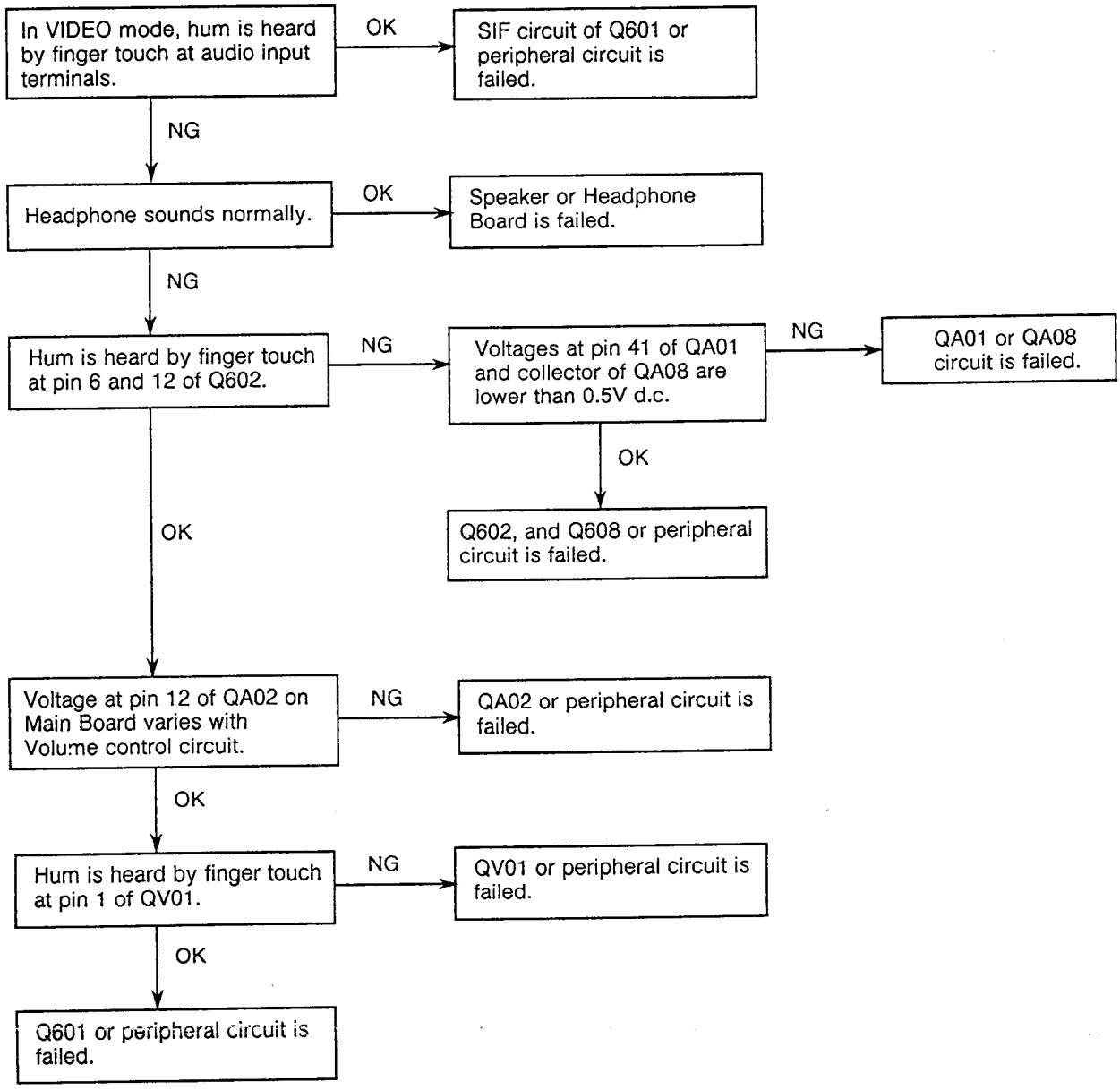
3. NO RASTER (SOUND OK)


Heater Elements of CRT are lighting or not?
YES
NO
Check H. V. at 2nd Anode of CRT.
Check Heater pulse at pin 9 of T461.
DEAD
ABNORMAL
NORMAL
Check/Replace Video Amp. Circuit.
Check/Replace Horiz. Output Trans. T461.
Check/Replace Horiz. Output Trans. T461.
Check/Replace Wiring and Fusible Resistor R920.
STILL NO RASTER
Replace CRT V901 (heater open)

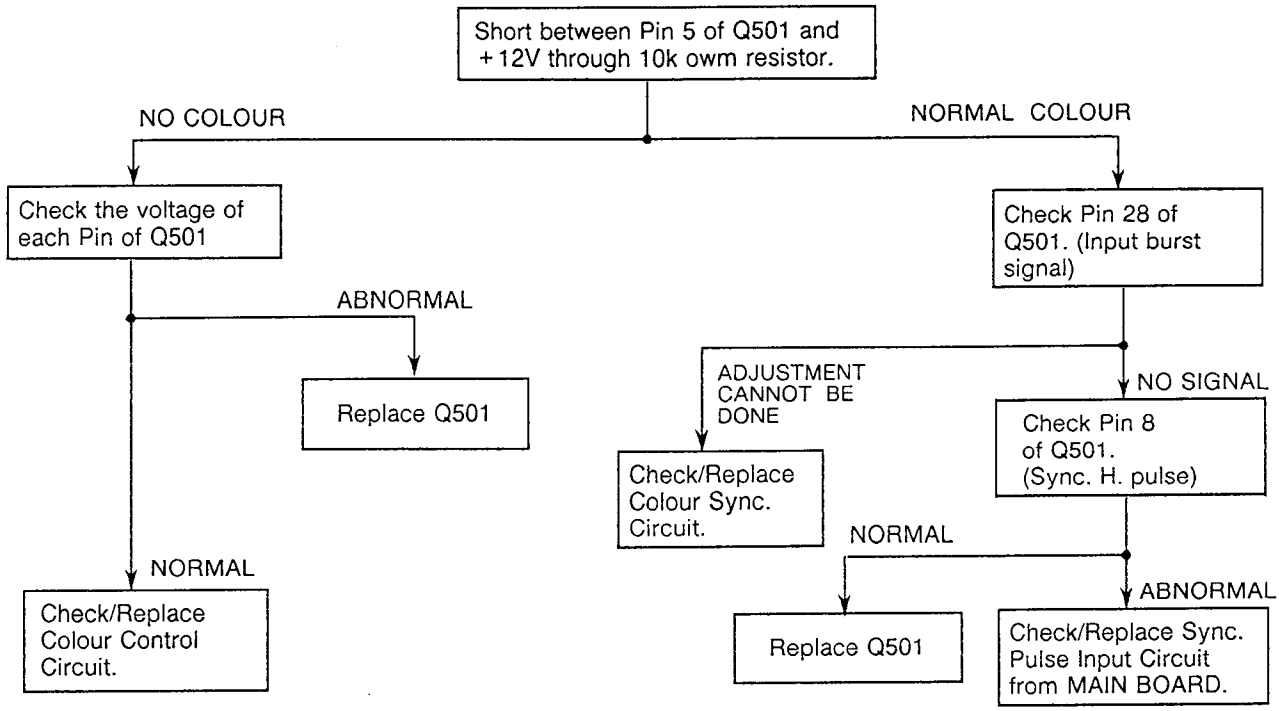
4. NO PICTURE


Check base of Q201 (PIF Det Output Signal).
NG
OK
Measure the voltage of terminal +B (+12V) of tuner.
ABNORMAL
NORMAL
Check/Replace tuner.
Check +12V Line of Main Board to tuner.
Check video signal at pin 18 of QV01 on Main Board.
NG
Q201, QV01 or peripheral circuit is failed.
OK
Check pin 10 of Q501 on Main Board.
NG
QV06 or Q202 is failed.
OK
Check pin 12, 14, 16 of Q501.
NG
Video circuit in Q501 is failed.
OK
Check CRT Drive Board.

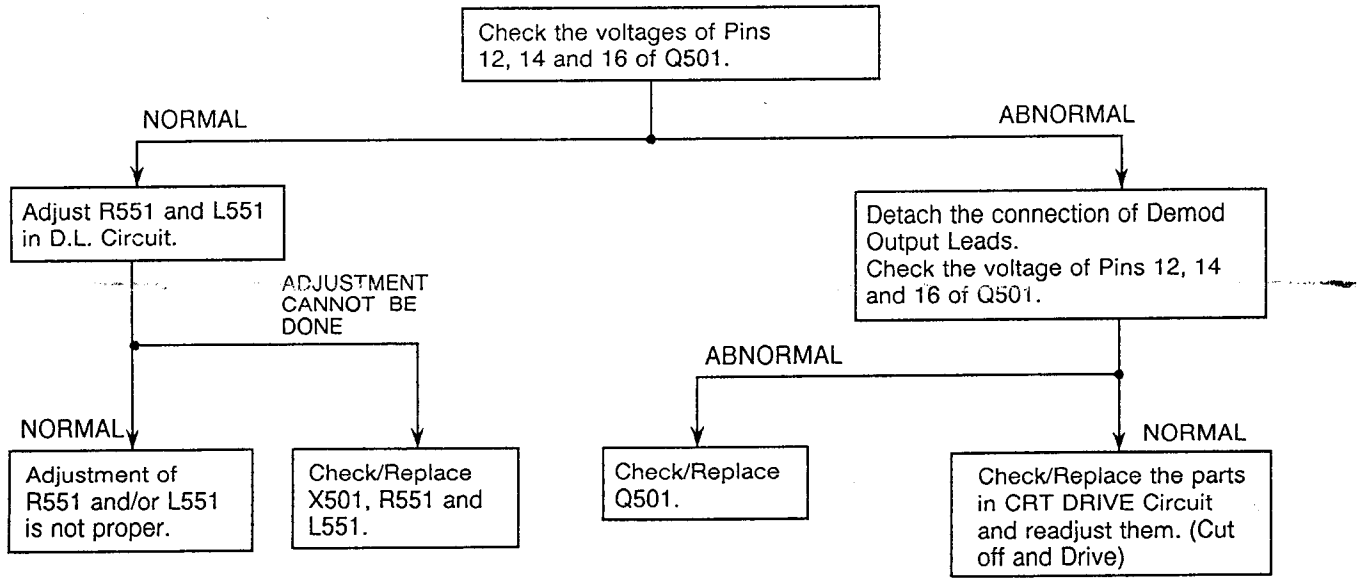
5. NO SOUND


In VIDEO mode, hum is heard by finger touch at audio input terminals.
OK
SIF circuit of Q601 or peripheral circuit is failed.
NG
Headphone sounds normally.
OK
Speaker or Headphone Board is failed.
NG
Hum is heard by finger touch at pin 6 and 12 of Q602.
NG
Voltages at pin 41 of QA01 and collector of QA08 are lower than 0.5V d.c.
NG
QA01 or QA08 circuit is failed.
OK
Q602, and Q608 or peripheral circuit is failed.
OK
Voltage at pin 12 of QA02 on Main Board varies with Volume control circuit.
NG
QA02 or peripheral circuit is failed.
OK
Hum is heard by finger touch at pin 1 of QV01.
NG
QV01 or peripheral circuit is failed.
OK
Q601 or peripheral circuit is failed.

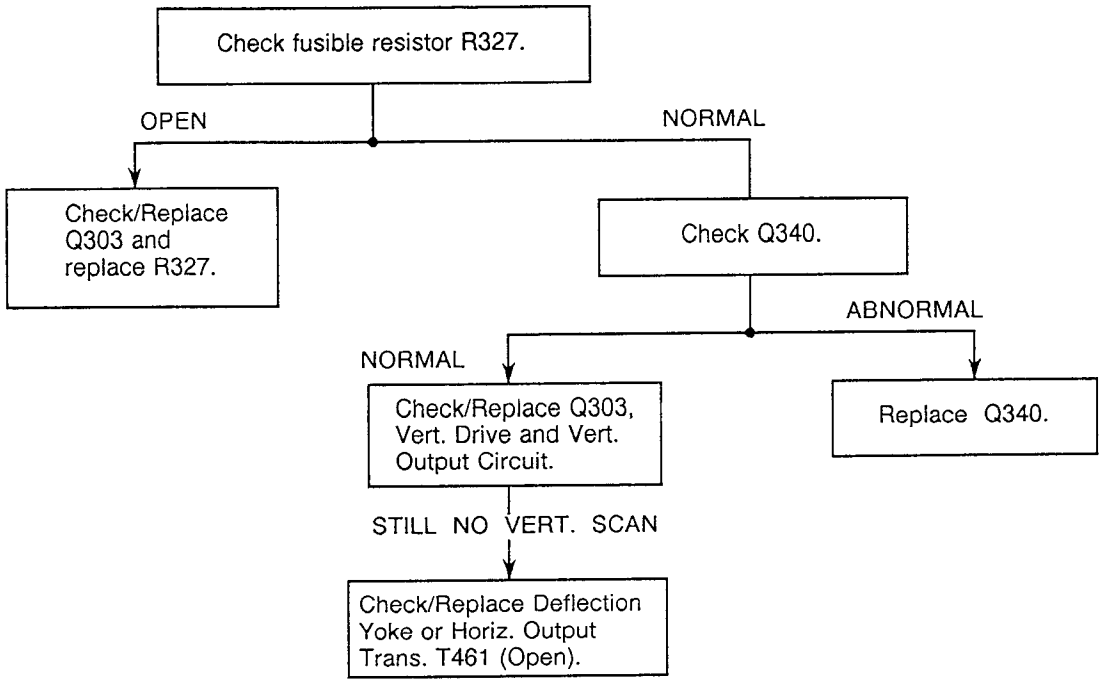
6. NO COLOUR


Short between Pin 5 of Q501 and +12V through 10k owm resistor.
NO COLOUR
NORMAL COLOUR
Check the voltage of each Pin of Q501
ABNORMAL
Replace Q501
NORMAL
Check/Replace Colour Control Circuit.
Check Pin 28 of Q501. (Input burst signal)
ADJUSTMENT CANNOT BE DONE
Check/Replace Colour Sync. Circuit.
NO SIGNAL
Check Pin 8 of Q501. (Sync. H. pulse)
NORMAL
Replace Q501
ABNORMAL
Check/Replace Sync. Pulse Input Circuit from MAIN BOARD.

7. SPECIFIC TINTED COLOUR


Check the voltages of Pins 12, 14 and 16 of Q501.
NORMAL
ABNORMAL
Adjust R551 and L551 in D.L. Circuit.
ADJUSTMENT CANNOT BE DONE
NORMAL
Adjustment of R551 and/or L551 is not proper.
Check/Replace X501, R551 and L551.
Detach the connection of Demod Output Leads.
Check the voltage of Pins 12, 14 and 16 of Q501.
ABNORMAL
Check/Replace Q501.
NORMAL
Check/Replace the parts in CRT DRIVE Circuit and readjust them. (Cut off and Drive)

8. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



9. OUT OF VERT. SYNC. AND HORIZ. SYNC.

Check/Replace Sync. Circuit from pin 5 of Q340 to pin 6 of Q340.

10. OUT OF VERT. SYNC.

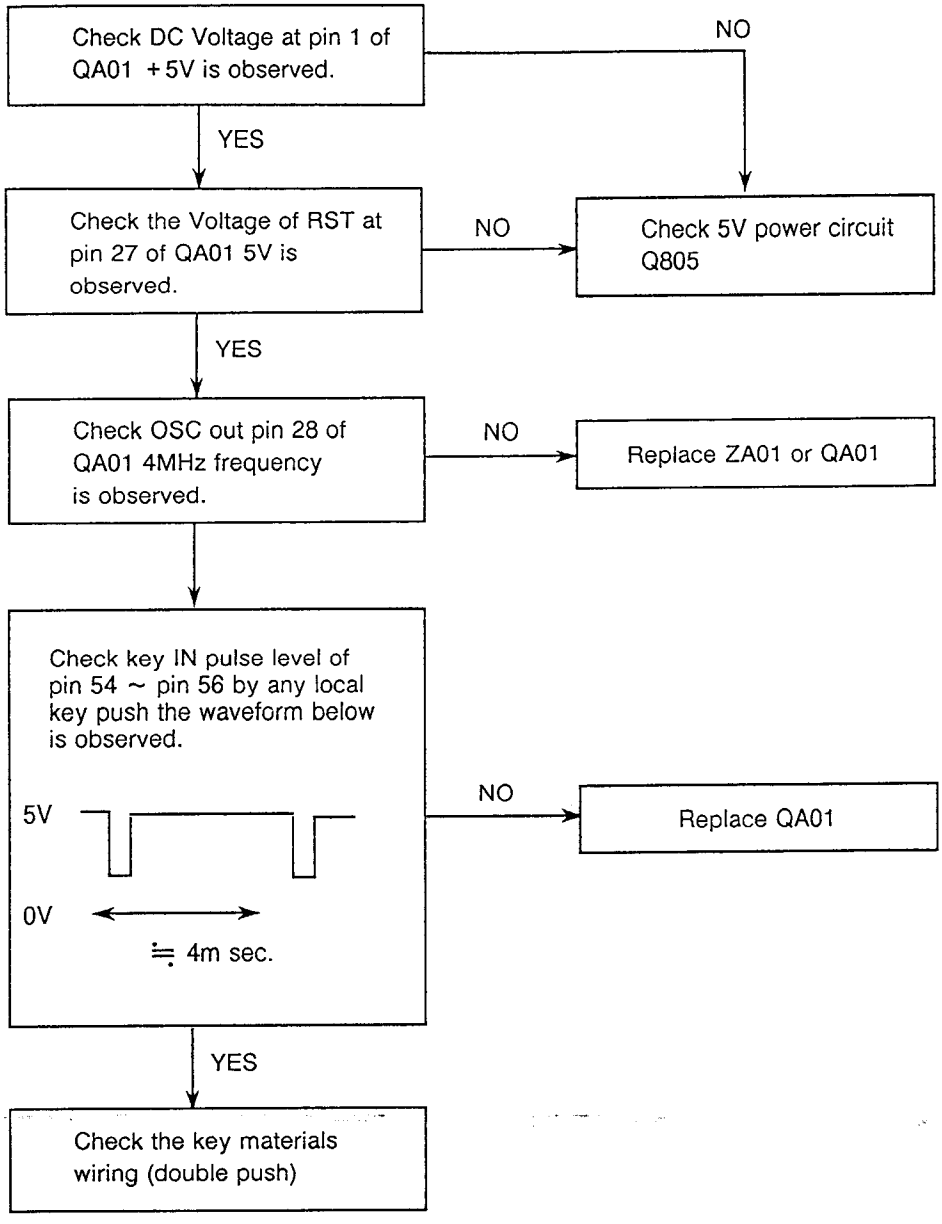
Check/Replace Vert. OSC Circuit and Vert. Hold Circuit connected to Pins 1, 2 and 10 of of Q340. Check/Replace Q340.

11. OUT OF HORIZ. SYNC.

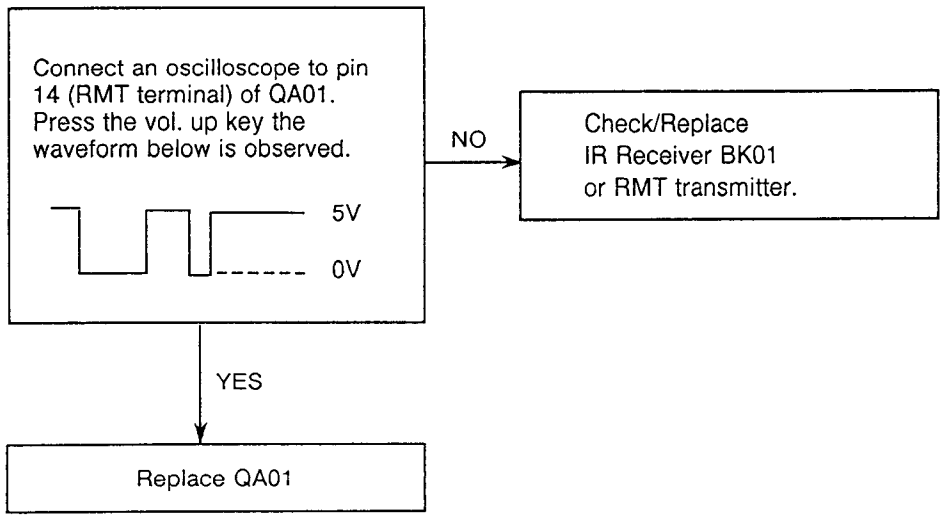
Check/Replace Horiz. OSC Circuit and Horiz. Hold and Horiz. AFC Circuit connected to Pins 10, 15 of Q340. Check/Replace Q340.

12. CHANNEL SELECTOR TROUBLE

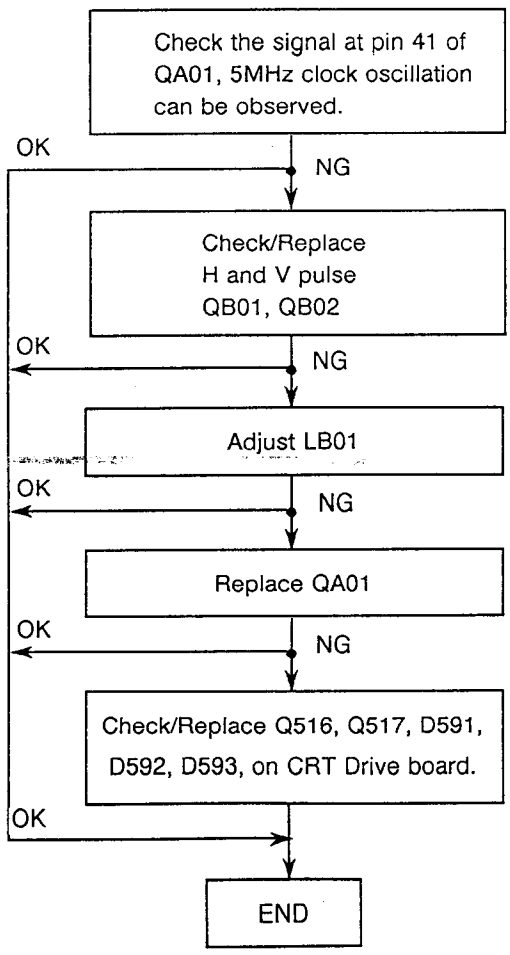
(1) Can not be controlled by any local and any RMT key.


Check DC Voltage at pin 1 of QA01 +5V is observed.
NO
YES
Check the Voltage of RST at pin 27 of QA01 5V is observed.
NO
Check 5V power circuit Q805
YES
Check OSC out pin 28 of QA01 4MHz frequency is observed.
NO
Replace ZA01 or QA01
Check key IN pulse level of pin 54 ~ pin 56 by any local key push the waveform below is observed.
5V
0V
≒ 4m sec.
NO
Replace QA01
YES
Check the key materials wiring (double push)

(2) Can not be controlled by any RMT key of remote hand unit.

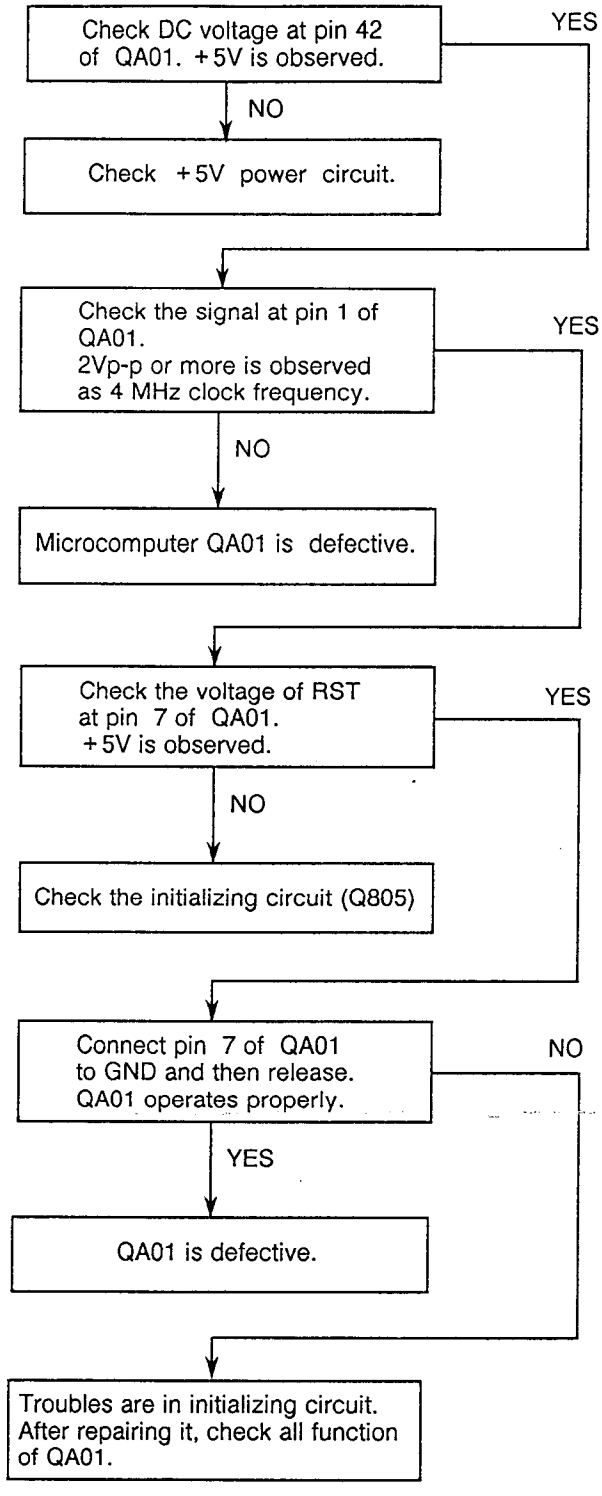

Connect an oscilloscope to pin 14 (RMT terminal) of QA01. Press the vol. up key the waveform below is observed.
5V
0V
NO
Check/Replace IR Receiver BK01 or RMT transmitter.
YES
Replace QA01

(3) No on-screen display

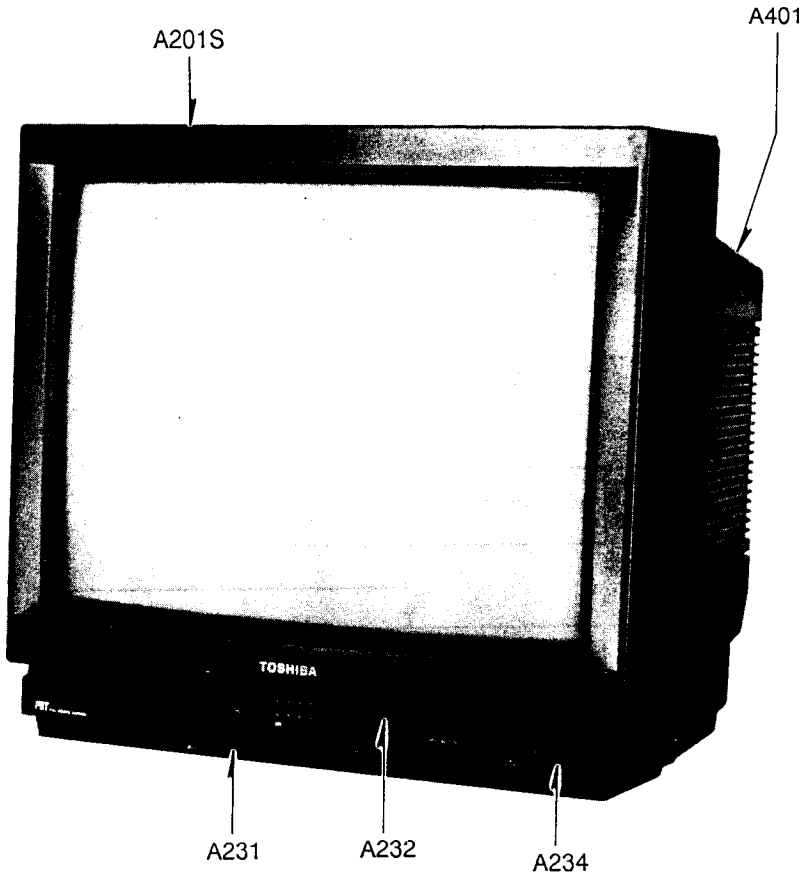


(4) Microcomputer QA01 Operation Check

NOTE: Before checking Microcomputer, check that control buttons and their connection work properly.


Check DC voltage at pin 42 of QA01. +5V is observed.
YES
NO
Check +5V power circuit.
Check the signal at pin 1 of QA01. 2Vp-p or more is observed as 4 MHz clock frequency.
YES
NO
Microcomputer QA01 is defective.
Check the voltage of RST at pin 7 of QA01. +5V is observed.
YES
NO
Check the initializing circuit (Q805)
Connect pin 7 of QA01 to GND and then release. QA01 operates properly.
NO
YES
QA01 is defective.
Troubles are in initializing circuit. After repairing it, check all function of QA01.

CABINET REPLACEMENT PARTS LIST



Location No.	Part No.	Description
A201S	23418232	Front Cover
A217	23451115	Fix Nut (TV Stand)
A231	23423246	Door
A232	70368125	Push Catch for Door
A234	23443116	Button, POWER
A237	70393022	Nut
A401	23423067	Back Cover
A411	23998307	Label, Model No., B/C
A422	23451115	Fix Nut (TV Stand)
A701	23523068	Carton Box
A702	23934443	Packing, Bottom
A703	23934444	Packing, Top
A710	23998308	Label, Model No., Carton
Y101	23994669	Owner's Manual
Y140	23805404	Z Stand, Left
Y141	23805405	Z Stand, Right
Y142	23805420	Video Shelf
Y202	23943632	Stand Accessory

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" , "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

ABBREVIATIONS:

Capacitors..... CD : Ceramic Disk PF : Plastic Film EL : Electrolytic
Resistors..... CF : Carbon Film CC : Carbon Composition MF : Metal Film
OMF : Oxide Metal Film VR : Variable Resistor FR : Fusible Resistor
(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C171	24085988	EL, 1μF, ±20%, 50V, Non-Polar
C202	24530223	PF, 0.022μF, ±10%, 63V
C203	24436820	CD, 82pF
C240	24530474	PF, 0.47μF, ±10%, 63V
C301	24212121	CD, 120pF, ±10%
C302	24633100	EL, 10μF, 16V
C303	24636010	EL, 1μF, 50V
C304	24797220	EL, 22μF, 50V
C305	24794470	EL, 47μF, 16V
C306	24550154	PF, 0.15μF, 63V
C308	24550563	PF, 0.056μF, 63V
C311	24796102	EL, 1000μF, 35V
C313	24797101	EL, 100μF, 50V
C315	24214221	CD, 220pF, ±10%, 500V
C316	24796102	EL, 1000μF, 35V
C317	24617995	EL, 4.7μF, ±10%, 50V
C318	24693223	PF, 0.022μF, 100V
C320	24693104	PF, 0.1μF, 100V
C321	24214151	CD, 150pF, ±10%, 500V
C360	24530224	PF, 0.22μF, ±10%, 63V
C401	24530104	PF, 0.1μF, ±10%, 63V
C402	24212561	CD, 560pF, ±10%
C404	24530154	PF, 0.15μF, ±10%, 63V
C405	24598272	PF, 2700pF
C406	24636100	EL, 10μF, 50V
C407	24636479	EL, 4.7μF, 50V
C408	24794470	EL, 47μF, 16V
C409	24530473	PF, 0.047μF, ±10%, 63V
C410	24693222	PF, 2200pF, 100V
C416	24214271	CD, 270pF, ±10%, 500V
⚠ C440	24095893	PF, 6200pF, ±3%, 1600V
C441	24214221	CD, 220pF, ±10%, 500V
C442	24095949	PF, 0.33μF, 200V
C443	24214221	CD, 220pF, ±10%, 500V
C445	24095903	PF, 0.056μF, ±10%, 250V
C447	24644479	EL, 4.7μF, 250V
C448	24795102	EL, 1000μF, 25V
C449	24794471	EL, 470μF, 16V
C451	24758101	EL, 100μF, 160V

Location No.	Part No.	Description
⚠ C463	24212222	CD, 2200pF, ±10%
⚠ C464	24442391	CD, 390pF, ±10%, 2kV
C501	24436150	CD, 15pF
C502	24436100	CD, 10pF, ±0.25pF
C503	24636100	EL, 10μF, 50V
C504	24530334	PF, 0.033μF, ±10%, 63V
C505	24550334	PF, 0.33μF, 63V
C506	24436120	CD, 12pF
C507	24232103	CD, 0.01μF, +80%, −20%
C508	24232103	CD, 0.01μF, +80%, −20%
C509	24212271	CD, 270pF, ±10%
C510	24212271	CD, 270pF, ±10%
C511	24232103	CD, 0.01μF, +80%, −20%
C512	24636229	EL, 2.2μF, 50V
C513	24232103	CD, 0.01μF, +80%, −20%
C514	24636478	EL, 0.47μF, 50V
C515	24636478	EL, 0.47μF, 50V
C517	24636478	EL, 0.47μF, 50V
C518	24530104	PF, 0.1μF, ±10%, 63V
C519	24530104	PF, 0.1μF, ±10%, 63V
C520	24530104	PF, 0.1μF, ±10%, 63V
C521	24794101	EL, 100μF, 16V
C522	24636479	EL, 4.7μF, 50V
C523	24796330	EL, 33μF, 35V
C524	24636100	EL, 10μF, 50V
C529	24794101	EL, 100μF, 16V
C532	24436220	CD, 22pF
C533	24436120	CD, 12pF
C534	24436560	CD, 56pF
C535	24636100	EL, 10μF, 50V
C536	24636478	EL, 0.47μF, 50V
C537	24794101	EL, 100μF, 16V
C539	24232103	CD, 0.01μF, +80%, −20%
C540	24633100	EL, 10μF, 16V
C551	24093928	Variable Capacitor, 5.2 to 30pF, 100V
C601	24436470	CD, 47pF
C602	24436470	CD, 47pF
C603	24530473	PF, 0.047μF, ±10%, 63V
C604	24794470	EL, 47μF, 16V
C605	24212561	CD, 560pF, ±10%

Location No.	Part No.	Description
C606	24436510	CD, 51pF
C607	24530473	PF, 0.047μF, ±10%, 63V
C608	24636010	EL, 1μF, 50V
C609	24636100	EL, 10μF, 50V
C610	24636100	EL, 10μF, 50V
C611	24232103	CD, 0.01μF, +80%, −20%
C612	24550103	PF, 0.01μF, 63V
C613	24550104	PF, 0.1μF, 63V
C614	24636010	EL, 1μF, 50V
C616	24636100	EL, 10μF, 50V
C620	24085031	EL, 1μF, ±20%, 25V, Non-Polar
C629	24530104	PF, 0.1μF, ±10%, 63V
C630	24794101	EL, 100μF, 16V
C631	24530224	PF, 0.22μF, ±10%, 63V
C632	24636010	EL, 1μF, 50V
C635	24436101	CD, 100pF
C636	24795102	EL, 1000μF, 25V
C637	24795471	EL, 470μF, 25V
C643	24636229	EL, 2.2μF, 50V
C681	24636479	EL, 4.7μF, 50V
C682	24636100	EL, 10μF, 50V
⚠ C801	24098999	PF, 0.1μF, ±20%, AC250V
⚠ C802	24098999	PF, 0.1μF, ±20%, AC250V
⚠ C803	24094906	CD, 4700pF, +80%, −20%, AC250V
⚠ C804	24094906	CD, 4700pF, +80%, −20%, AC250V
⚠ C805	24094906	CD, 4700pF, +80%, −20%, AC250V
⚠ C806	24094906	CD, 4700pF, +80%, −20%, AC250V
C810	24086871	EL, 120μF, ±20%, 400V
C811	24442391	CD, 390pF, ±10%, 2kV
C814	24797101	EL, 100μF, 50V
C815	24591223	PF, 0.022μF
C816	24820103	PF, 0.01μF, 630V
C817	24442561	CD, 560pF, ±10%, 2kV
C818	24798220	EL, 22μF, 100V
C819	24214331	CD, 330pF, ±10%, 500V
C822	24212681	CD, 680pF, ±10%
C823	24633100	EL, 10μF, 16V
C830	24215181	CD, 180pF, ±10%, 1kV
C831	24086953	EL, 220μF, ±20%, 160V
C832	24795222	EL, 2200μF, 25V
C835	24796471	EL, 470μF, 35V
C841	24214181	CD, 180pF, ±10%, 500V
C842	24795222	EL, 2200μF, 25V
C844	24634470	EL, 47μF, 25V
C845	24633100	EL, 10μF, 16V
C861	24820683	PF, 0.068μF, 630V
C862	24442331	CD, 330pF, ±10%, 2kV
C863	24550563	PF, 0.056μF, 63V
C864	24797101	EL, 100μF, 50V
C866	24797470	EL, 47μF, 50V
C867	24442561	CD, 560pF, ±10%, 2kV
C868	24212102	CD, 1000pF, ±10%
C869	24636100	EL, 10μF, 50V
⚠ C881	24094656	CD, 2200pF, ±20%, AC400V
⚠ C882	24094656	CD, 2200pF, ±20%, AC400V
C901	24644479	EL, 4.7μF, 250V
C902	24095923	PF, 4700pF, 1600V
CA01	24794470	EL, 47μF, 16V
CA02	24633100	EL, 10μF, 16V

Location No.	Part No.	Description
CA03	24232103	CD, 0.01μF, +80%, −20%
CA04	24795101	EL, 100μF, 25V
CA05	24212472	CD, 4700pF, ±10%
CA06	24436300	CD, 30pF
CA08	24212472	CD, 4700pF, ±10%
CA09	24436102	CD, 1000pF
CA10	24212102	CD, 1000pF, ±10%
CA11	24436561	CD, 560pF
CA12	24550104	PF, 0.1μF, 63V
CA13	24636010	EL, 1μF, 50V
CA14	24232103	CD, 0.01μF, +80%, −20%
CA16	24633470	EL, 47μF, 16V
CA20	24436391	CD, 390pF
CA21	24436221	CD, 220pF
CA27	24530104	PF, 0.1μF, ±10%, 63V
CA28	24636010	EL, 1μF, 50V
CA29	24232103	CD, 0.01μF, +80%, −20%
CA30	24436300	CD, 30pF
CF08	24550473	PF, 0.047μF, 63V
CH10	24636010	EL, 1μF, 50V
CH11	24636010	EL, 1μF, 50V
CH12	24636010	EL, 1μF, 50V
CH13	24636100	EL, 10μF, 50V
CH19	24794471	EL, 470μF, 16V
CS04	24795470	EL, 47μF, 25V
CV01	24636010	EL, 1μF, 50V
CV02	24636100	EL, 10μF, 50V
CV03	24232103	CD, 0.01μF, +80%, −20%
CV04	24636010	EL, 1μF, 50V
CV05	24636100	EL, 10μF, 50V
CV06	24636010	EL, 1μF, 50V
CV07	24636100	EL, 10μF, 50V
CV08	24212471	CD, 470pF, ±10%
CV09	24636100	EL, 10μF, 50V
CV10	24636010	EL, 1μF, 50V
CV11	24232103	CD, 0.01μF, +80%, −20%
CV12	24232103	CD, 0.01μF, +80%, −20%
CV13	24436101	CD, 100pF
CV14	24797220	EL, 22μF, 50V
CV15	24636010	EL, 1μF, 50V
CV16	24636100	EL, 10μF, 50V

RESISTORS

R171	24366333	CF, 33k ohm
R172	24366333	CF, 33k ohm
R173	24366104	CF, 100k ohm
R174	24366103	CF, 10k ohm
R175	24366683	CF, 68k ohm
R176	24366683	CF, 68k ohm
R177	24366134	CF, 130k ohm
R201	24366331	CF, 330 ohm
⚠ R202	24552151	OMF, 150 ohm, 1/2W
R203	24366473	CF, 47k ohm
R204	24366132	CF, 1300 ohm
R205	24366102	CF, 1k ohm
R206	24366101	CF, 100 ohm
R209	24366152	CF, 1500 ohm
R210	24366103	CF, 10k ohm
R211	24366102	CF, 1k ohm
R212	24366223	CF, 22k ohm
R215	24366683	CF, 68k ohm
R216	24366223	CF, 22k ohm
R217	24366391	CF, 390 ohm
R218	24366391	CF, 390 ohm

Location No.	Part No.	Description
R219	24366222	CF, 2200 ohm
R220	24366752	CF, 7500 ohm
R221	24366222	CF, 2200 ohm
R240	24366101	CF, 100 ohm
R242	24366223	CF, 22k ohm
R243	24366183	CF, 18k ohm
R252	24061590	VR, 5k ohm, 1/8W
R253	24061590	VR, 5k ohm, 1/8W
R255	24066713	VR, 10k ohm, ±20%, 0.15W
R301	24366102	CF, 1k ohm
R302	24366682	CF, 6800 ohm
R303	24366153	CF, 15k ohm
R306	24366220	CF, 22 ohm
R308	24366562	CF, 5600 ohm
R311	24366155	CF, 1.5M ohm
R315	24366332	CF, 3300 ohm
R316	24366393	CF, 39k ohm
⚠ R317	24383511	OMF, 510 ohm, 2W
⚠ R319	24382122	OMF, 1200 ohm, 1W
R320	24366102	CF, 1k ohm
⚠ R323	24321918	OMF, 0.91 ohm, 1/2W
⚠ R325	24552122	OMF, 1200 ohm, 1/2W
⚠ R326	24552122	OMF, 1200 ohm, 1/2W
⚠ R327	24547229	FR, 2.2 ohm, 1W
R332	24366362	CF, 3600 ohm
R333	24366202	CF, 2k ohm
R352	24066715	VR, 220k ohm, ±20%
R360	24366184	CF, 180k ohm
R361	24366244	CF, 240k ohm
R362	24366153	CF, 15k ohm
R401	24366103	CF, 10k ohm
R402	24366123	CF, 12k ohm
R403	24366273	CF, 27k ohm
R404	24366821	CF, 820 ohm
R405	24366184	CF, 180k ohm
⚠ R406	24327303	MF, 30k ohm, ±1%, 1/4W
R407	24366334	CF, 330k ohm
R408	24366222	CF, 2200 ohm
R410	24366471	CF, 470 ohm
R411	24366330	CF, 33 ohm
R412	24366332	CF, 3300 ohm
⚠ R416	24007568	Cement, 1800 ohm, 5W
R417	24366103	CF, 10k ohm
R418	24366473	CF, 47k ohm
⚠ R420	24009951	OMF, 1k ohm, 1W
R430	24366510	CF, 51 ohm
⚠ R440	24552103	OMF, 10k ohm, 1/2W
⚠ R441	24552103	OMF, 10k ohm, 1/2W
⚠ R442	24553751	OMF, 750 ohm, 1W
⚠ R444	24007850	Cement, 16 ohm, 10W
⚠ R448	24558279	FR, 2.7 ohm, ±10%, 2W
R451	24066824	VR, 10k ohm, ±20%, 1/10W
R453	24069490	VR, 20k ohm, 0.08W
R501	24366821	CF, 820 ohm
R502	24366682	CF, 6800 ohm
R506	24366102	CF, 1k ohm
R509	24366471	CF, 470 ohm
R510	24366182	CF, 1800 ohm
R511	24366102	CF, 1k ohm
R514	24366683	CF, 68k ohm
R516	24366183	CF, 18k ohm
R517	24366102	CF, 1k ohm
R521	24366101	CF, 100 ohm
R523	24366101	CF, 100 ohm

Location No.	Part No.	Description
R525	24366101	CF, 100 ohm
R527	24366101	CF, 100 ohm
R528	24366102	CF, 1k ohm
R531	24366272	CF, 2700 ohm
R532	24366272	CF, 2700 ohm
R533	24366132	CF, 1300 ohm
R534	24376104	CF, 100k ohm, 1/2W
R535	24366332	CF, 3300 ohm
R536	24376104	CF, 100k ohm, 1/2W
R537	24366132	CF, 1300 ohm
R538	24366332	CF, 3300 ohm
R539	24366132	CF, 1300 ohm
R540	24376104	CF, 100k ohm, 1/2W
R541	24366821	CF, 820 ohm
R542	24366271	CF, 270 ohm
R543	24366512	CF, 5100 ohm
R544	24366101	CF, 100 ohm
R545	24366101	CF, 100 ohm
R547	24366471	CF, 470 ohm
R548	24366471	CF, 470 ohm
R549	24366471	CF, 470 ohm
R551	24066826	VR, 1k ohm, ±20%, 1/10W
R557	24061591	VR, 2k ohm, 1/8W
R558	24061591	VR, 2k ohm, 1/8W
R559	24061591	VR, 2k ohm, 1/8W
R560	24366512	CF, 5100 ohm
R561	24366821	CF, 820 ohm
R562	24366332	CF, 3300 ohm
R563	24366512	CF, 5100 ohm
R564	24366101	CF, 100 ohm
R565	24366101	CF, 100 ohm
R567	24366101	CF, 100 ohm
R570	24366562	CF, 5600 ohm
R571	24366562	CF, 5600 ohm
R572	24366562	CF, 5600 ohm
R573	24366104	CF, 100k ohm
⚠ R591	24009957	OMF, 10k ohm, 2W
⚠ R592	24009957	OMF, 10k ohm, 2W
⚠ R593	24009957	OMF, 10k ohm, 2W
R601	24366471	CF, 470 ohm
R602	24366102	CF, 1k ohm
R603	24366564	CF, 560k ohm
R604	24366222	CF, 2200 ohm
R605	24366102	CF, 1k ohm
R606	24366332	CF, 3300 ohm
R607	24366562	CF, 5600 ohm
R608	24366182	CF, 1800 ohm
R609	24366103	CF, 10k ohm
⚠ R623	24321479	OMF, 4.7 ohm, 1/2W
R624	24366334	CF, 330k ohm
R630	24366101	CF, 100 ohm
R631	24366223	CF, 22k ohm
R632	24366223	CF, 22k ohm
R634	24366222	CF, 2200 ohm
⚠ R637	24547479	FR, 4.7 ohm, 1W
R661	24942221	CC, 220 ohm, 1/2W
R681	24366223	CF, 22k ohm
R682	24366473	CF, 47k ohm
R683	24366392	CF, 3900 ohm
R684	24366103	CF, 10k ohm
⚠ R801	24515120	Cement, 12 ohm, 7W
⚠ R802	24515120	Cement, 12 ohm, 7W
⚠ R810	24000838	FR, 0.33 ohm, ±10%, 2W
R811	24377224	CF, 220k ohm, 1W

Location No.	Part No.	Description
⚠ R812	24322689	OMF, 6.8 ohm, 1W
⚠ R813	24009945	OMF, 47 ohm, 2W
R814	24366681	CF, 680 ohm
⚠ R815	24321479	OMF, 4.7 ohm, 1/2W
R816	24366102	CF, 1k ohm
⚠ R817	24384683	OMF, 68k ohm, 3W
R818	24366561	CF, 560 ohm
R822	24378203	CF, 20k ohm, ±2%, 1/8W
R825	24366563	CF, 56k ohm
⚠ R827	24382390	OMF, 39 ohm, 1W
R828	24366822	CF, 8200 ohm
⚠ R830	24321228	OMF, 0.22 ohm, 1/2W
⚠ R833	24382333	OMF, 33k ohm, 1W
⚠ R840	24009944	OMF, 240 ohm, 2W
⚠ R841	24009944	OMF, 240 ohm, 2W
⚠ R843	24531150	FR, 15 ohm, 1/2W
R844	24366152	CF, 1500 ohm
R845	24366102	CF, 1k ohm
R848	24366330	CF, 33 ohm
⚠ R861	24383134	OMF, 130k ohm, 2W
⚠ R863	24383134	OMF, 130k ohm, 2W
⚠ R864	24321229	OMF, 2.2 ohm, 1/2W
⚠ R865	24382681	OMF, 680 ohm, 1W
⚠ R866	24382150	OMF, 15 ohm, 1W
R867	24366681	CF, 680 ohm
R868	24366102	CF, 1k ohm
R869	24366681	CF, 680 ohm
⚠ R870	24383470	OMF, 47 ohm, 2W
⚠ R872	24552102	OMF, 1k ohm, 1/2W
⚠ R873	24000919	FR, 1 ohm, 2W
R874	24377224	CF, 220k ohm, 1W
⚠ R880	24009944	OMF, 240 ohm, 2W
⚠ R890	24000630	PTC Thermistor, Dual
R901	24946272	CC, 2700 ohm, ±10%, 1/2W
R902	24946272	CC, 2700 ohm, ±10%, 1/2W
R903	24946272	CC, 2700 ohm, ±10%, 1/2W
⚠ R920	24000919	FR, 1 ohm, 2W
RA01	24366273	CF, 27k ohm
RA02	24366123	CF, 12k ohm
RA03	24366123	CF, 12k ohm
RA04	24366473	CF, 47k ohm
RA06	24366103	CF, 10k ohm
RA08	24366224	CF, 220k ohm
RA09	24366102	CF, 1k ohm
RA10	24366102	CF, 1k ohm
RA11	24366102	CF, 1k ohm
RA12	24366102	CF, 1k ohm
RA13	24366102	CF, 1k ohm
RA16	24366473	CF, 47k ohm
RA17	24366683	CF, 68k ohm
RA18	24366473	CF, 47k ohm
RA19	24366223	CF, 22k ohm
RA21	24366223	CF, 22k ohm
RA22	24366333	CF, 33k ohm
RA23	24366333	CF, 33k ohm
RA24	24366333	CF, 33k ohm
RA25	24890225	CF, 2.2M ohm, 1/4W
RA26	24366221	CF, 220 ohm
RA27	24366333	CF, 33k ohm
RA28	24366103	CF, 10k ohm
RA29	24366103	CF, 10k ohm
RA31	24366103	CF, 10k ohm
RA32	24366224	CF, 220k ohm
RA33	24366392	CF, 3900 ohm

Location No.	Part No.	Description
RA34	24366103	CF, 10k ohm
RA35	24366103	CF, 10k ohm
RA36	24366473	CF, 47k ohm
RA37	24366152	CF, 1500 ohm
RA38	24366103	CF, 10k ohm
RA39	24366103	CF, 10k ohm
RA40	24366683	CF, 68k ohm
RA43	24366471	CF, 470 ohm
RA46	24366473	CF, 47k ohm
RA47	24366473	CF, 47k ohm
RA48	24366472	CF, 4700 ohm
RA49	24366472	CF, 4700 ohm
RA51	24366103	CF, 10k ohm
RA52	24366103	CF, 10k ohm
RA53	24366473	CF, 47k ohm
RA54	24366473	CF, 47k ohm
RA55	24366102	CF, 1k ohm
RA56	24366472	CF, 4700 ohm
RA62	24366564	CF, 560k ohm
RA63	24366561	CF, 560 ohm
RA65	24366103	CF, 10k ohm
RA66	24366123	CF, 12k ohm
RA67	24366123	CF, 12k ohm
RA68	24366563	CF, 56k ohm
RA70	24945565	CC, 5.6M ohm, ±10%, 1/4W
RA71	24945565	CC, 5.6M ohm, ±10%, 1/4W
RA72	24945565	CC, 5.6M ohm, ±10%, 1/4W
RA73	24945565	CC, 5.6M ohm, ±10%, 1/4W
RA75	24366102	CF, 1k ohm
RA76	24366102	CF, 1k ohm
RA77	24366472	CF, 4700 ohm
RA78	24366472	CF, 4700 ohm
RA83	24366102	CF, 1k ohm
RA84	24366102	CF, 1k ohm
RA85	24366472	CF, 4700 ohm
RA86	24366102	CF, 1k ohm
RA87	24366472	CF, 4700 ohm
RA88	24366472	CF, 4700 ohm
RA90	24366472	CF, 4700 ohm
RA91	24366102	CF, 1k ohm
RA92	24366102	CF, 1k ohm
RA93	24366102	CF, 1k ohm
RA95	24366102	CF, 1k ohm
⚠ RA97	24383183	OMF, 18k ohm, 2W
RA98	24366102	CF, 1k ohm
RB01	24366102	CF, 1k ohm
RB02	24366102	CF, 1k ohm
RB03	24366103	CF, 10k ohm
RB04	24366103	CF, 10k ohm
RB05	24366332	CF, 3300 ohm
RB06	24366103	CF, 10k ohm
RB07	24366332	CF, 3300 ohm
RB08	24366473	CF, 47k ohm
RB09	24366102	CF, 1k ohm
RH10	24366510	CF, 51 ohm
RH11	24366510	CF, 51 ohm
RH12	24366510	CF, 51 ohm
RH15	24366104	CF, 100k ohm
RH16	24366102	CF, 1k ohm
RH17	24366471	CF, 470 ohm
RH18	24366104	CF, 100k ohm
RH21	24366750	CF, 75 ohm
RH22	24366103	CF, 10k ohm
RH23	24366680	CF, 68 ohm

Location No.	Part No.	Description
RH24	24366910	CF, 91 ohm
RH25	24366562	CF, 5600 ohm
RH26	24366562	CF, 5600 ohm
RH27	24366220	CF, 22 ohm
RH28	24366220	CF, 22 ohm
RH29	24366220	CF, 22 ohm
RR02	24366222	CF, 2200 ohm
RR06	24366331	CF, 330 ohm
RR81	24366332	CF, 3300 ohm
⚠ RS05	24546569	FR, 5.6 ohm, 1/2W
RS06	24366561	CF, 560 ohm
RV01	24366101	CF, 100 ohm
RV02	24366820	CF, 82 ohm
RV03	24366101	CF, 100 ohm
RV04	24366820	CF, 82 ohm
RV05	24366101	CF, 100 ohm
RV06	24366104	CF, 100k ohm
RV07	24366101	CF, 100 ohm
RV08	24366910	CF, 91 ohm
RV09	24366104	CF, 100k ohm
RV13	24366473	CF, 47k ohm
RV14	24366102	CF, 1k ohm
RV15	24366103	CF, 10k ohm
RV16	24366103	CF, 10k ohm
RV17	24366101	CF, 100 ohm
RV19	24366102	CF, 1k ohm
RV20	24366332	CF, 3300 ohm
RV21	24366102	CF, 1k ohm
RV22	24366472	CF, 4700 ohm
⚠ RV23	24552750	OMF, 75 ohm, 1/2W
RV24	24366101	CF, 100 ohm
RV25	24366152	CF, 1500 ohm
RV26	24366102	CF, 1k ohm
RV28	24366104	CF, 100k ohm
RV29	24366122	CF, 1200 ohm
RV30	24366102	CF, 1k ohm
RV31	24366682	CF, 6800 ohm
RV33	24366223	CF, 22k ohm
RV34	24366473	CF, 47k ohm
RV35	24366473	CF, 47k ohm
RV36	24366473	CF, 47k ohm
RV37	24366123	CF, 12k ohm
RV38	24366152	CF, 1500 ohm
RV39	24366103	CF, 10k ohm
RV40	24366473	CF, 47k ohm
RV41	24366473	CF, 47k ohm
RV42	24366331	CF, 330 ohm
RV43	24366102	CF, 1k ohm
RV45	24366103	CF, 10k ohm
RV46	24366103	CF, 10k ohm
RV47	24366101	CF, 100 ohm
RV48	24366101	CF, 100 ohm

COILS & TRANSFORMERS

L201	23237987	Coil, Peaking, TRF4100AC
L202	23237978	Coil, Peaking, TRF4560AC
L311	23261974	Coil, Choke, HC5-035
⚠ L411	23233065	Coil, Linearity, TLN2111
⚠ L462	23227339	Deflection Yoke, 4700-02
L501	23237981	Coil, Peaking, TRF4330AC
L502	23237985	Coil, Peaking, TRF4150AC
L503	23238919	Coil, Peaking, TRF4180AC
L551	23270999	Coil, Delay Line, TRF5402
L601	23238921	Coil, Peaking, TRF4120AC
L602	23237986	Coil, Peaking, TRF4120AC
L603	23237981	Coil, Peaking, TRF4330AC
L604	23238912	Coil, Peaking, TRF4680AC
L802	23103940	Coil (Ferrite Bead), TEM2001
L803	23103940	Coil (Ferrite Bead), TEM2001
L830	23261975	Coil, Choke, TRF9229
L831	23221060	Coil, Choke, TLN1015E
L832	23221060	Coil, Choke, TLN1015E
L841	23103940	Coil (Ferrite Bead), TEM2001
L842	23222694	Coil, Width, TLN2026
L861	23103940	Coil (Ferrite Bead), TEM2001
L862	23103940	Coil (Ferrite Bead), TEM2001
⚠ L901	23200779	Coil, Degaussing, TSB-2231
LV01	23237988	Coil, Peaking, TRF4829AC
⚠ T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠ T461	23236231	Transformer, Flayback, LOT478052.00
T801	23211858	Line Filter, TRF3139
⚠ T802	23213673	Transformer, Converter, TPW3079
⚠ T803	23213658	Transformer, Converter, TPW3087

SEMICONDUCTORS

IC303	23119548	IC, AN5515
IC340	23318359	IC, TDA2579-N6
IC405	23318218	IC, μPC7812H
IC501	23318229	IC, TDA3561A
IC601	23318015	IC, AN5222
IC602	23119532	IC, TDA-1015
ICA01	23318441	IC, M37100M8-583
ICA02	23318414	IC, M6M80011P
ICV01	B0383505	IC, TA8720AN
Q171	23114691	Transistor, BC557A
Q172	23114691	Transistor, BC557A
Q173	23114689	Transistor, BC547A
Q201	23114689	Transistor, BC547A
Q202	23114689	Transistor, BC547A
Q303B	23035308	Screw, BTB3X8SZN
Q303C	23030211	Screw, 3X14SN
Q360	23114689	Transistor, BC547A
Q401	23114689	Transistor, BC547A
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠ Q404	23314375	Transistor, ON4404
Q404B	23030211	Screw, 3X14SN
Q502	23114689	Transistor, BC547A
Q505	23114693	Transistor, BF871
Q506	23114689	Transistor, BC547A
Q507	23114693	Transistor, BF871
Q508	23114689	Transistor, BC547A
Q509	23114693	Transistor, BF871
Q510	23114689	Transistor, BC547A
Q514	23114688	Transistor, BC327
Q515	23114689	Transistor, BC547A
Q516	A6734585	Transistor, 2SC752GTM-O
Q517	A6734585	Transistor, 2SC752GTM-O
Q603	23114689	Transistor, BC547A
Q690	23114632	Transistor, BC547B
⚠ Q801	23314098	Transistor (STR), STR54041
Q802	23114632	Transistor, BC547B
Q803	A6534145	Transistor, 2SA1020-Y
Q805	23314018	Transistor, 2SC3678
Q805E	23030211	Screw, 3X14SN

Location No.	Part No.	Description
Q806	A6534145	Transistor, 2SA1020-Y
Q808	23114632	Transistor, BC547B
Q809	23114546	Transistor, BC557B
Q810	A6842185	Transistor, 2SD553-Y
Q811	23114546	Transistor, BC557B
QA05	23114689	Transistor, BC547A
QA07	23114691	Transistor, BC557A
QA08	23114691	Transistor, BC557A
QA09	23114691	Transistor, BC557A
QA10	23114546	Transistor, BC557B
QA14	23114689	Transistor, BC547A
QA15	23114689	Transistor, BC547A
QR01	23114632	Transistor, BC547B
QS02	23314374	Transistor, BD945
QV04	A6342200	Transistor, 2SC2878-A
QV05	23114689	Transistor, BC547A
QV06	23114691	Transistor, BC557A
QV07	23114689	Transistor, BC547A
QV08	23114691	Transistor, BC557A
QV09	23114689	Transistor, BC547A
QV11	23114632	Transistor, BC547B
QV12	23114689	Transistor, BC547A
QV13	23114689	Transistor, BC547A
QV14	23114689	Transistor, BC547A
D171	23115599	Diode, 1N4148
D172	23115599	Diode, 1N4148
D204	23115599	Diode, 1N4148
D205	23115599	Diode, 1N4148
D224	A7150041	Diode, 1SS104
D302	23118479	Diode, BYD33J
D305	23118479	Diode, BYD33J
D320	A7272143	Diode, Zener, 1Z75
D321	23115599	Diode, 1N4148
D322	23118982	Diode, Zener, ZPD24
D403	23115604	Diode, Zener, ZPD6.2
D406	23118479	Diode, BYD33J
D408	23118479	Diode, BYD33J
D501	A7110664	Diode, Zener, 05Z24Y
D591	23115599	Diode, 1N4148
D592	23115599	Diode, 1N4148
D593	23115599	Diode, 1N4148
D594	23115599	Diode, 1N4148
D595	23115599	Diode, 1N4148
D596	23115599	Diode, 1N4148
D601	A7117935	Diode, Zener, 04AZ24R
D801	A7568410	Diode, TVR-4J
D802	A7568410	Diode, TVR-4J
D803	A7568410	Diode, TVR-4J
D804	A7568410	Diode, TVR-4J
D811	23118479	Diode, BYD33J
D812	23118736	Diode, BYV96E
D813	23118479	Diode, BYD33J
D815	23118479	Diode, BYD33J
D816	A7116615	Diode, Zener, 04AZ6.8Y
D820	23118736	Diode, BYV96E
D822	23118479	Diode, BYD33J
D825	23115599	Diode, 1N4148
D826	A7117315	Diode, Zener, 04AZ13Y
D827	23118479	Diode, BYD33J
D828	A7117705	Diode, Zener, 04AZ20X
D830	23118994	Diode, BYW95C
D831	23118479	Diode, BYD33J
D842	23118943	Diode, ERC20-04
D843	A7116315	Diode, Zener, 04AZ5.1Y

Location No.	Part No.	Description
DA03	23115599	Diode, 1N4148
DA05	23115599	Diode, 1N4148
DA11	23115599	Diode, 1N4148
DA12	23115599	Diode, 1N4148
DA13	23115599	Diode, 1N4148
DA14	23115599	Diode, 1N4148
DA15	23115599	Diode, 1N4148
DA16	23115599	Diode, 1N4148
DA17	23115599	Diode, 1N4148
DA18	23115599	Diode, 1N4148
DA19	23115599	Diode, 1N4148
DA20	23115599	Diode, 1N4148
DA27	23115599	Diode, 1N4148
DA30	23115878	Diode, Zener, μPC574J(L)
DA31	23115599	Diode, 1N4148
DA32	23115599	Diode, 1N4148
DA40	23115599	Diode, 1N4148
DE40	23118969	Diode (LED), MV57124, Red
DH11	23115599	Diode, 1N4148
DH14	23115599	Diode, 1N4148
DH15	23115599	Diode, 1N4148
⚠ DR10	23118447	Photo Coupler, CNY75C
DS03	A7117305	Diode, Zener, 04AZ13X
DV01	A7288601	Diode, 1S2186 FA-1
DV02	A7110262	Diode, Zener, 05Z9.1Y
DV03	A7116815	Diode, Zener, 04AZ8.2Y
DV04	23115599	Diode, 1N4148

MISCELLANEOUS

B295	23848140	Holder, Power Cord
⚠ F801	23144896	Fuse, T2.0A
F801A	23165102	Fuse Holder
K901	23120611	Remote Sensor, 9101-M
P001	23142465	Aerial Terminal, AT940
P661	23365292	Jack, 3.5mm
PH01	23365025	21 Pin Connector
PV01	23365259	Jack, 4P
PV02	23365351	Jack, Phono, 3P
S201	23145682	Switch, Lever, 1C3P
S301	23145682	Switch, Lever, 1C3P
S801	23344092	Switch, Power, 2C1P
SA01	23344093	Switch, Push, 1C1P
⚠ V901A	23902353	Socket, CRT, 10P
W201	23250877	Coil, Delay Line, TRF2082
W661	23151274	Speaker, SPK-1245, 100x100mm, 8 ohm
X501	23153774	Crystal, 8.8MHz
X502	23250949	Delay Line, PAL Chroma, DL701
Z201	23107876	Ceramic Video Trap, 6 to 6.5MHz, TCF1028
Z601	23107930	Ceramic Filter, 6.0MHz, TCF1008
Z602	23107659	Ceramic Descri., 6.0MHz, TCF1053
ZA01	23153845	Ceramic Resonator, 4MHz, TCR1015
ZA02	24000744	Resistor Block, 47k ohmx4, 1/8W
ZA03	24000744	Resistor Block, 47k ohmx4, 1/8W
ZA04	24094651	Capacitor Block, 100pFx4, 50V

Location No.	Part No.	Description
ZA05	24094645	Capacitor Block, 0.01μFx4, 50V
ZV01	23107849	Ceramic Video Trap, 4.43MHz, TCF1032
PC BOARD ASSEMBLIES		
U801	23335758	Power Board, PW9207
U902A	23335757	Main Board, PW9205
U903A	23335727	CRT Drive Board, PW9195-1
U903B	23335747	Mains Sw. Board, PW9195-2
U903C	23335748	IR-Amp Board, PW9195-3
PICTURE TUBE		
⚠ V901	23312067	Picture Tube, A51EBV12X01
TUNER		
H001	23121677	Tuner, UHF, UF745BAV
REMOTE HAND SET PARTS		
K902	23120493	Remote Hand Unit, CT9383
AT01	23300911	Upper Case
AT02	23300919	Lower Case
AT03	23300920	Battery Case
AT04	23300921	Filter
ST01	23300912	Rubber Sheet
UT01	23335516	PC Board, PW9674
ZT01	23153736	Ceramic Resonator, CSB455EB20

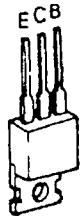
Location No.	Part No.	Description

TERMINAL VIEW OF TRANSISTORS

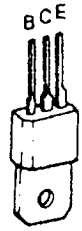
① BC327
BC337
BC547A
BC547B
BC547C
BC557A
BC557B
BC556A

② 2SK30ATM
2SK117

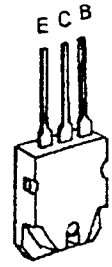
③ BD202



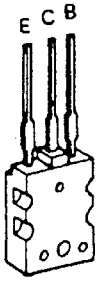
④ BF871
2SD553
2SC1569



⑤ 2SC3678
2SC3182N



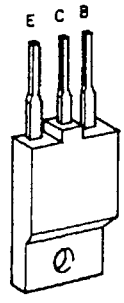
⑥ 2SD1427
2SD1432



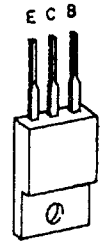
⑦ 2SC2482
2SA1321
2SC2230
2SA1020
2SC2655
2SC752GTM

⑧ 2SC388ATM
2SA1015
2SC1959
2SA562TM

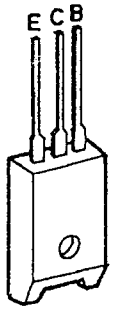
⑨ 2SD1548



⑩ 2SC2023

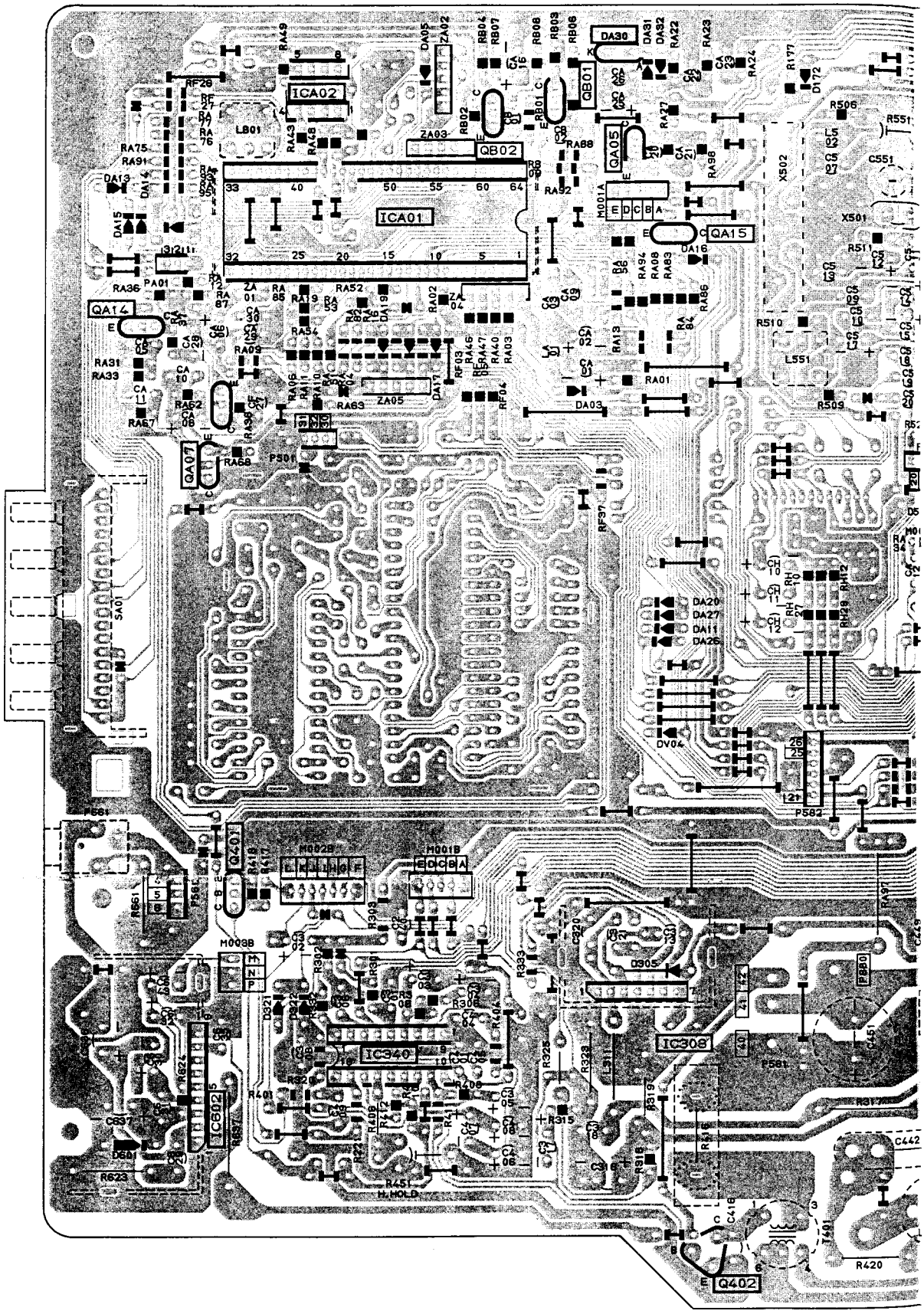


⑪ ON4409



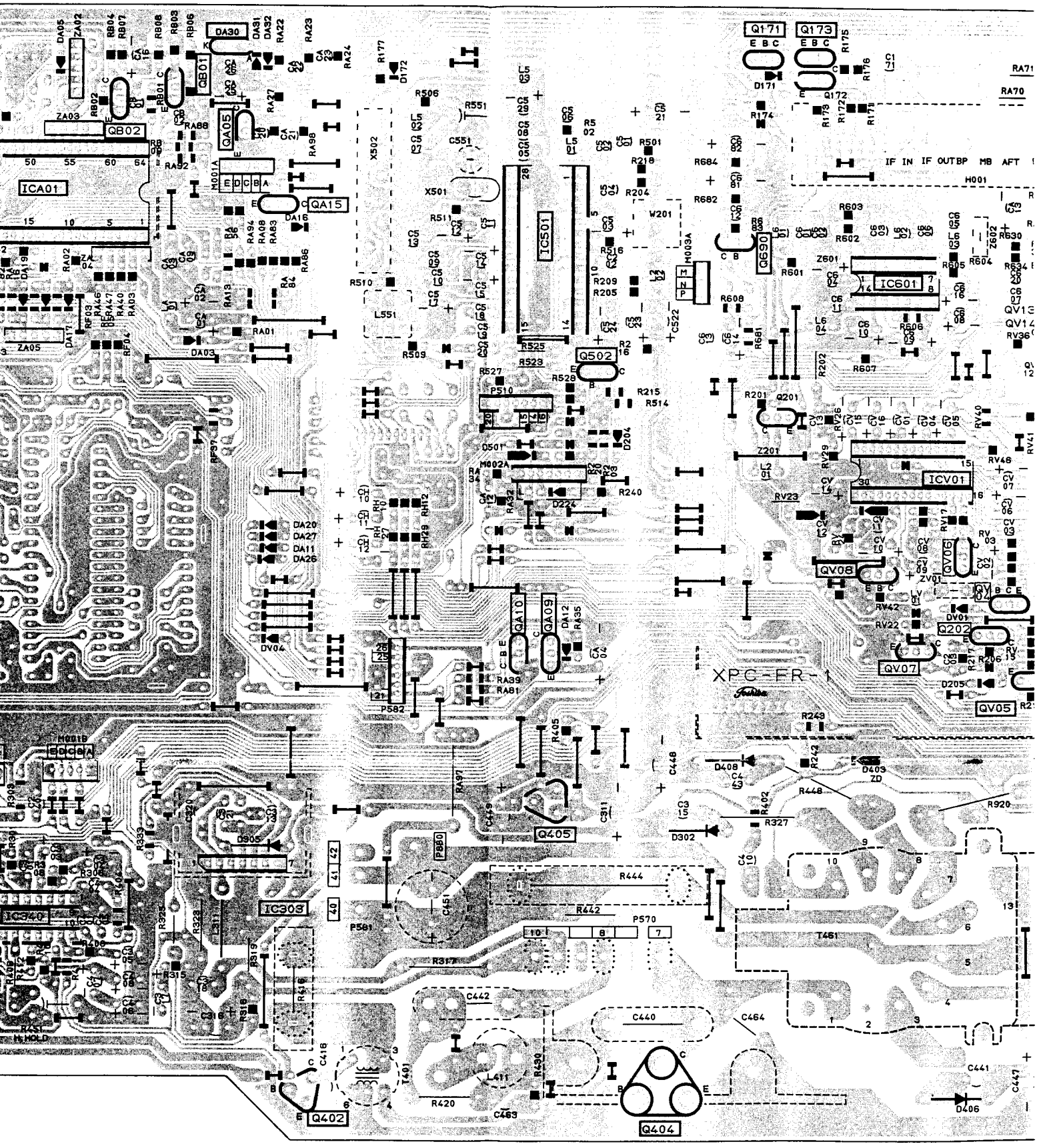
MAIN BOARD

BOTTOM (FO



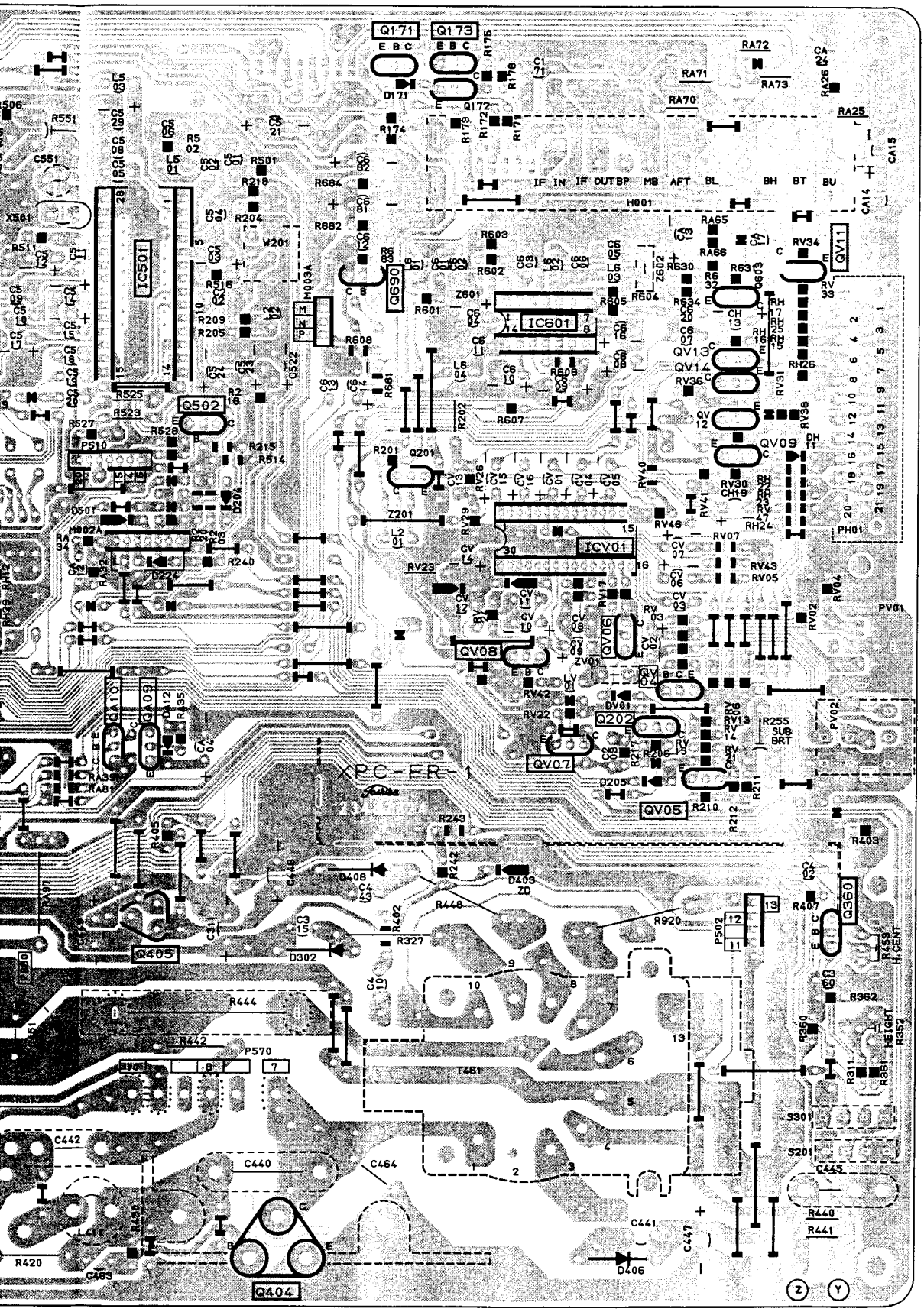
MAIN BOARD PW9205

BOTTOM (FOIL) SIDE



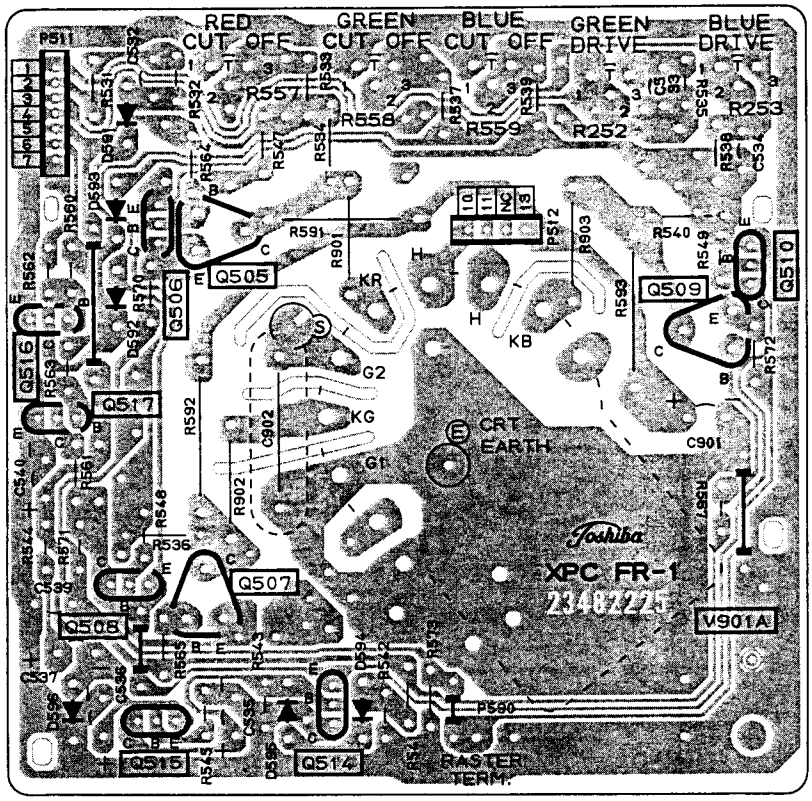
BOARD PW9205

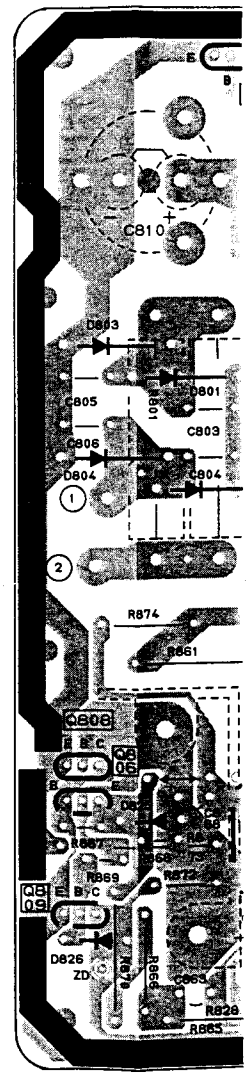
TOM (FOIL) SIDE



CRT DRIVE BOARD PW9195-1

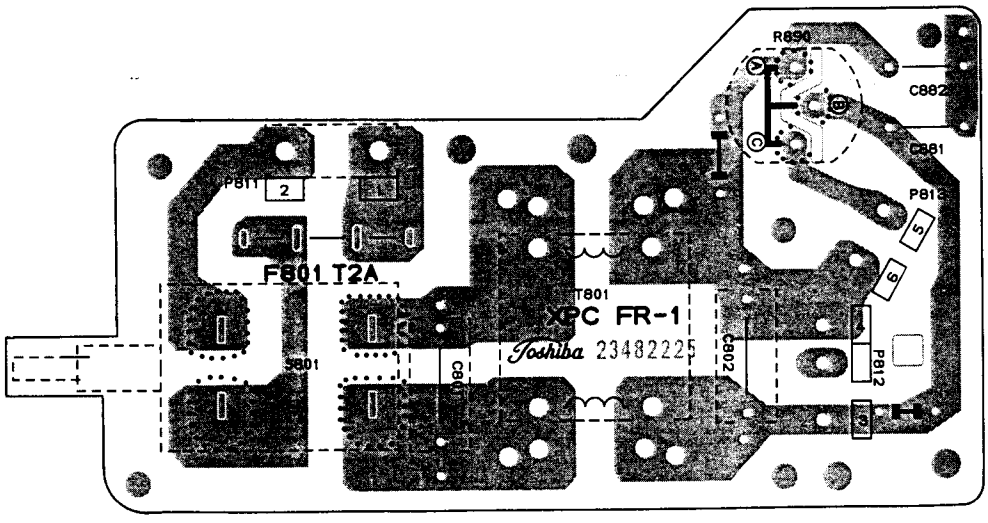
BOTTOM (FOIL) SIDE





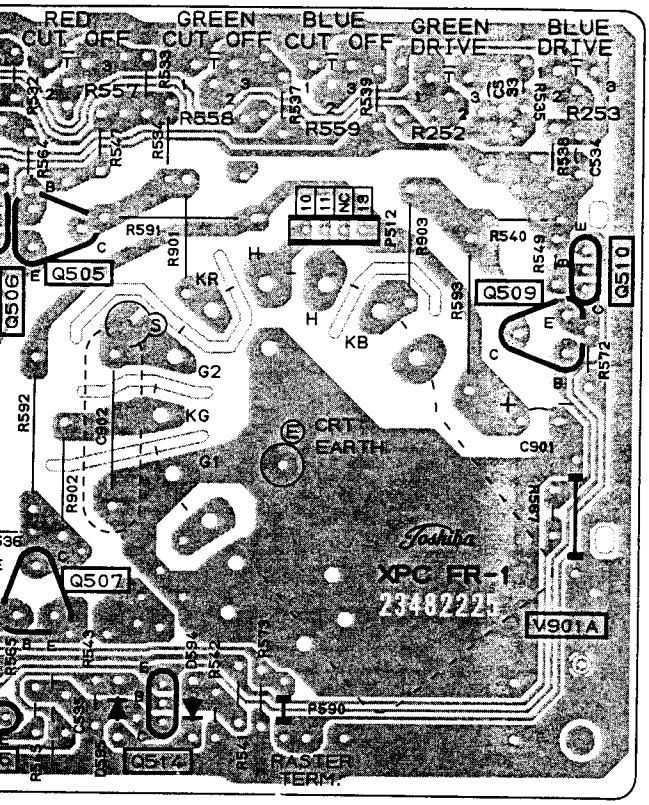
MAINS SW BOARD PW9195-2

BOTTOM (FOIL) SIDE



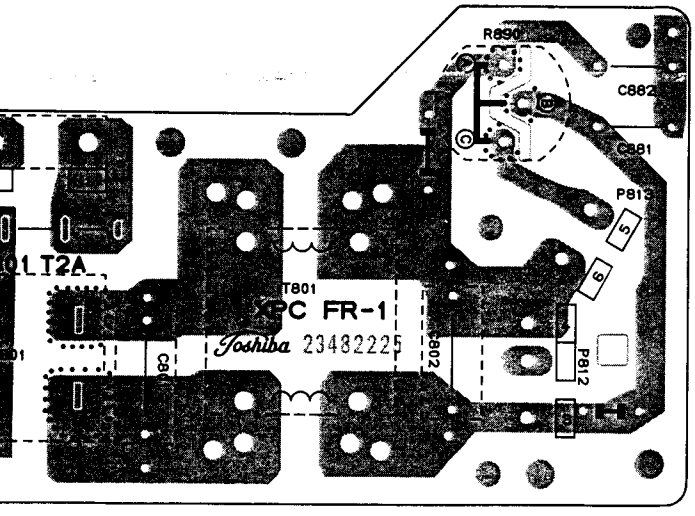
RT DRIVE BOARD PW9195-1

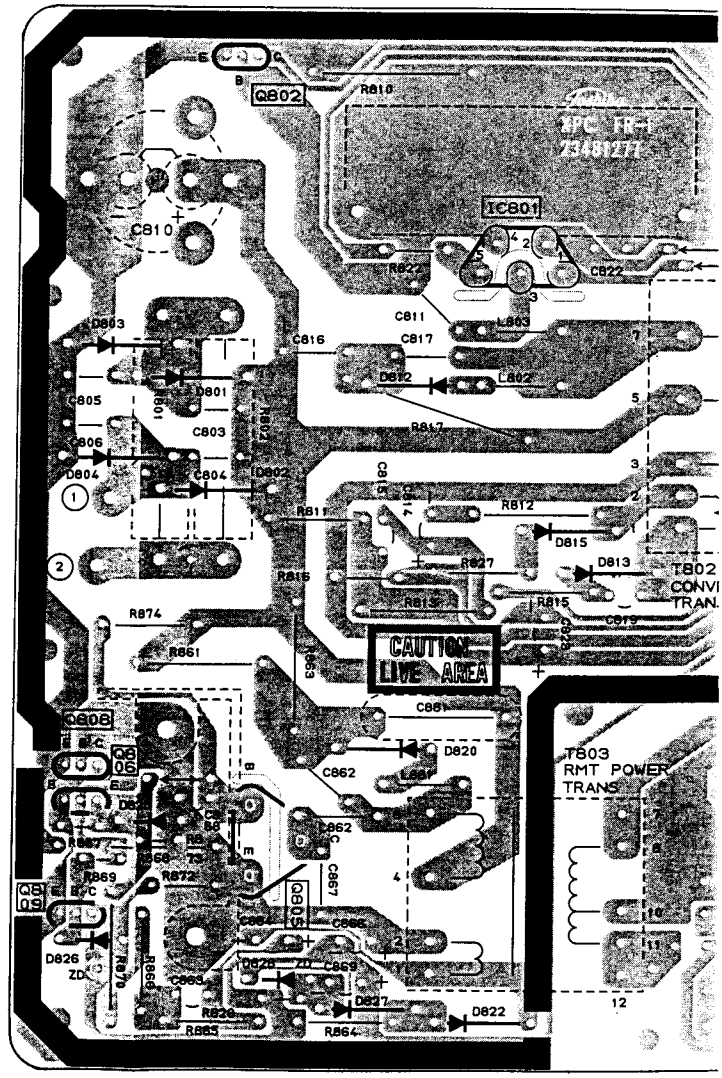
BOTTOM (FOIL) SIDE



AINS SW BOARD PW9195-2

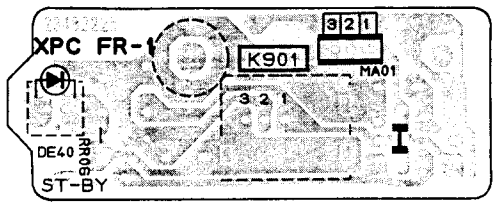
BOTTOM (FOIL) SIDE





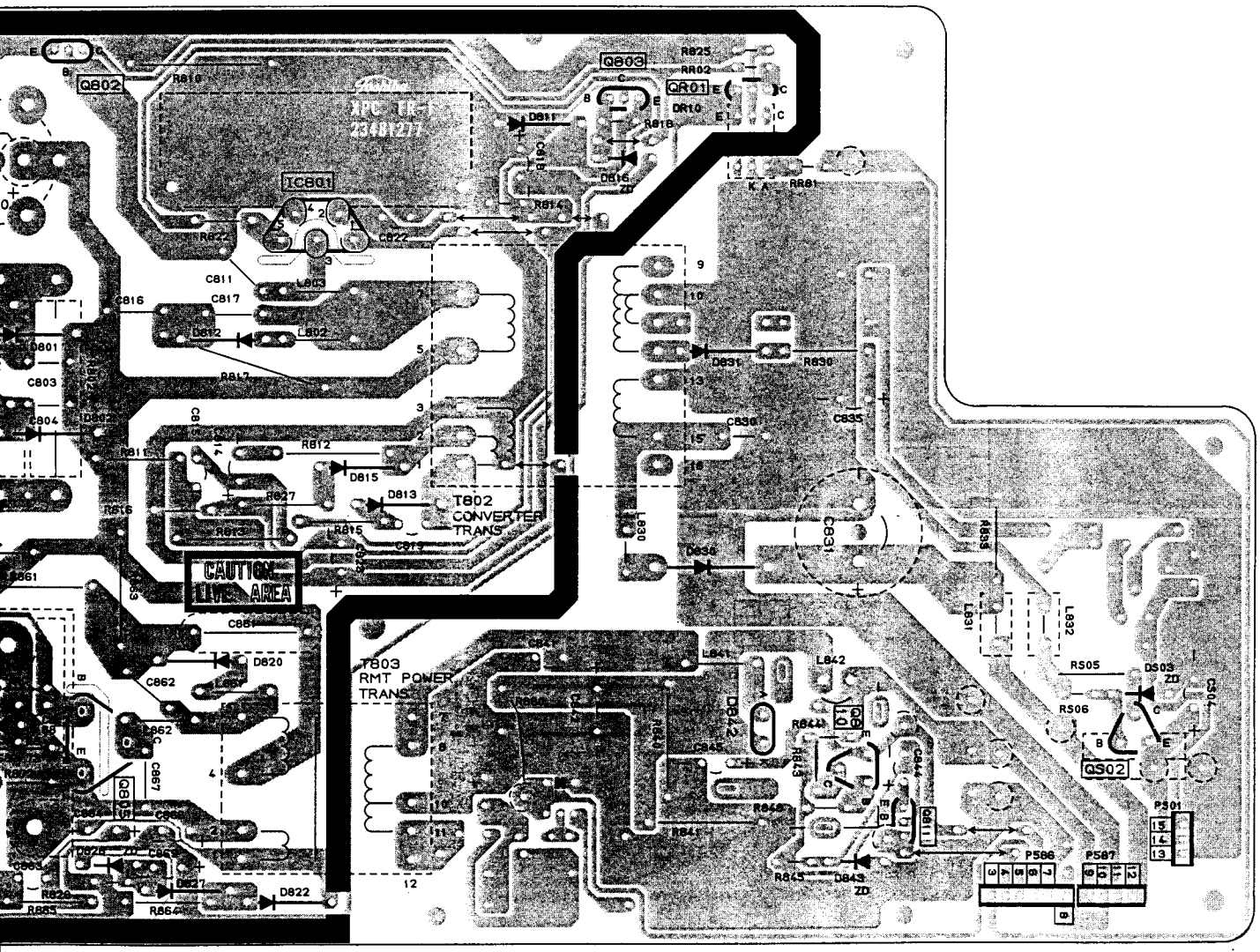
IR AMP BOARD PW9195-3

BOTTOM (FOIL) SIDE



POWER BOARD PW9207

BOTTOM (FOIL) SIDE



219R9B

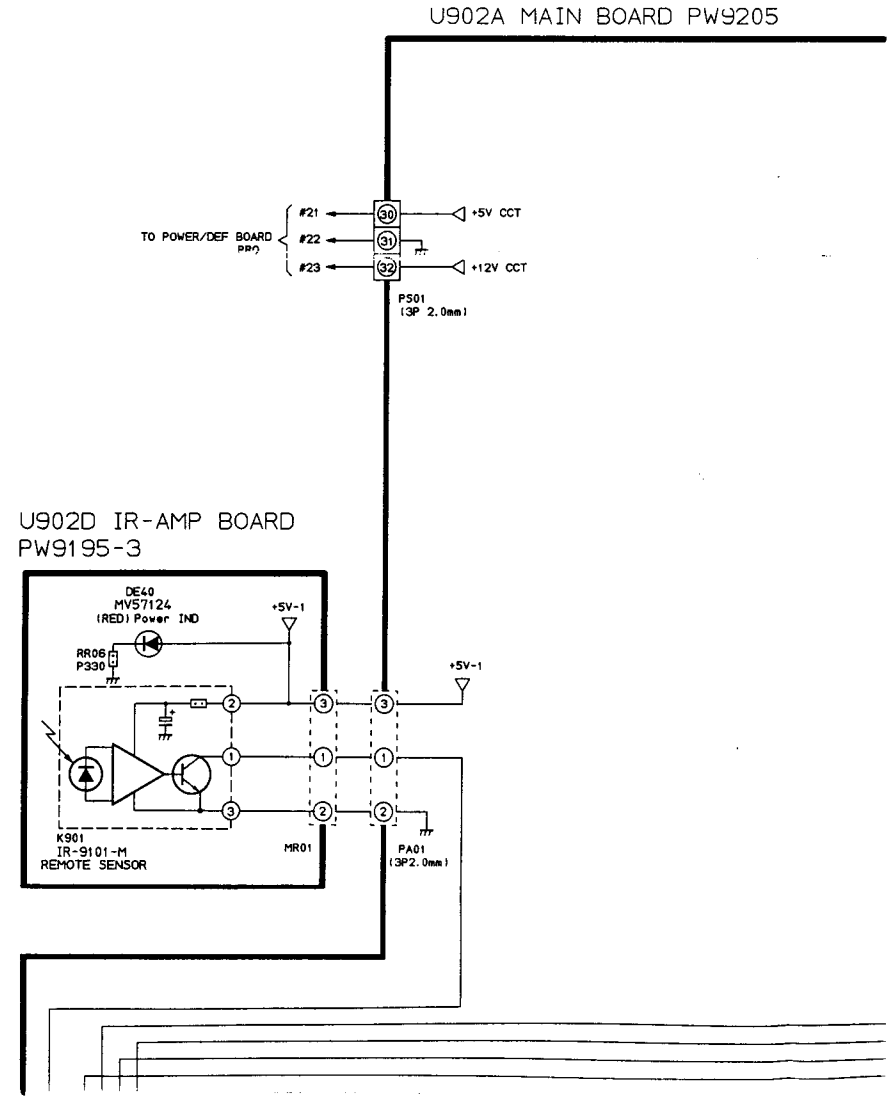
SCHEMATIC DIAGRAM (1/2)

IMPORTANT SAFETY NOTICE

Component marked with the International Hazard Symbol m
approved type and must be mounted as the original. This will
adhered to during manufacture will be maintained following

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltage readings were obtained using a high impedance
2. (–) or ground lead of instruments should be connecte
   shematic on checking Non-isolated circuit surrounded
   to the points marked (⏚) on checking isolated circui
3. The voltage readings may vary as much as ±20%.
4. Check that the Tuning, A.F.C., Brightness, Contrast an
   the best picture, making sure that the Contrast, Brigh
   near to their mid-positions.
5. The waveforms were taken using a standard colour ba
   wide band oscilloscope via a low capacity probe.



RTANT SAFETY NOTICE

onent marked with the International Hazard Symbol must, if changed, be replaced by an ved type and must be mounted as the original. This will ensure that the safety standards ed to during manufacture will be maintained following any servicing procedure.

ERVATION OF VOLTAGES AND WAVEFORMS

oltage readings were obtained using a high impedance digital voltmeter.
-) or ground lead of instruments should be connected to the ground marked (⊥) in the ematic on checking Non-isolated circuit surrounded by mark but should be connected the points marked (⏚) on checking isolated circuit.
ne voltage readings may vary as much as ±20%.
neck that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for e best picture, making sure that the Contrast,Brightness and Colour controls are set ear to their mid-positions.
ne waveforms were taken using a standard colour bar signal and were observed using a ide band oscilloscope via a low capacity probe.

NOTES:

1. This circuit diagram is subject to change without notice.

EXPRESSION

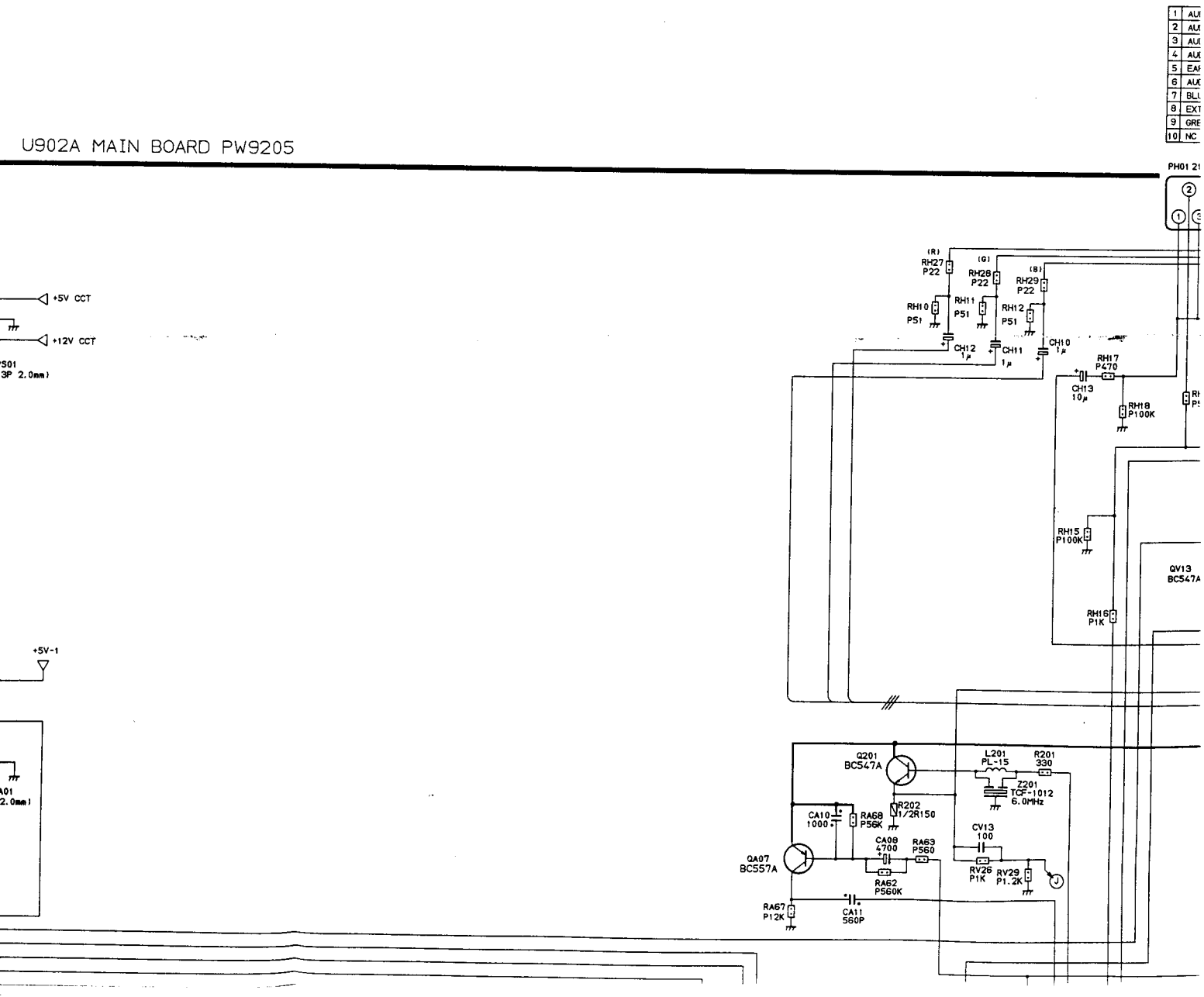
VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless otherwise noted in schematic, all capacitor values l μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values m μH, and the values less than 1 in H.

GROUNDING SYMBOL

1. ⊥: Non isolated ground, ⏚ : Isolated ground.

U902A MAIN BOARD PW9205



uit diagram is subject to change without notice.

SISTOR, CAPACITOR and INDUCTOR

shown in ohm, k=1,000, M=1,000,000.
wise noted in schematic, all capacitor values less than 1 are expressed in alues more than 1 in pF.
wise noted in schematic, all inductor values more than 1 are expressed in values less than 1 in H.

YMBOL

ed ground, ⏚ : Isolated ground.

RESISTORS

Prefixed to values:

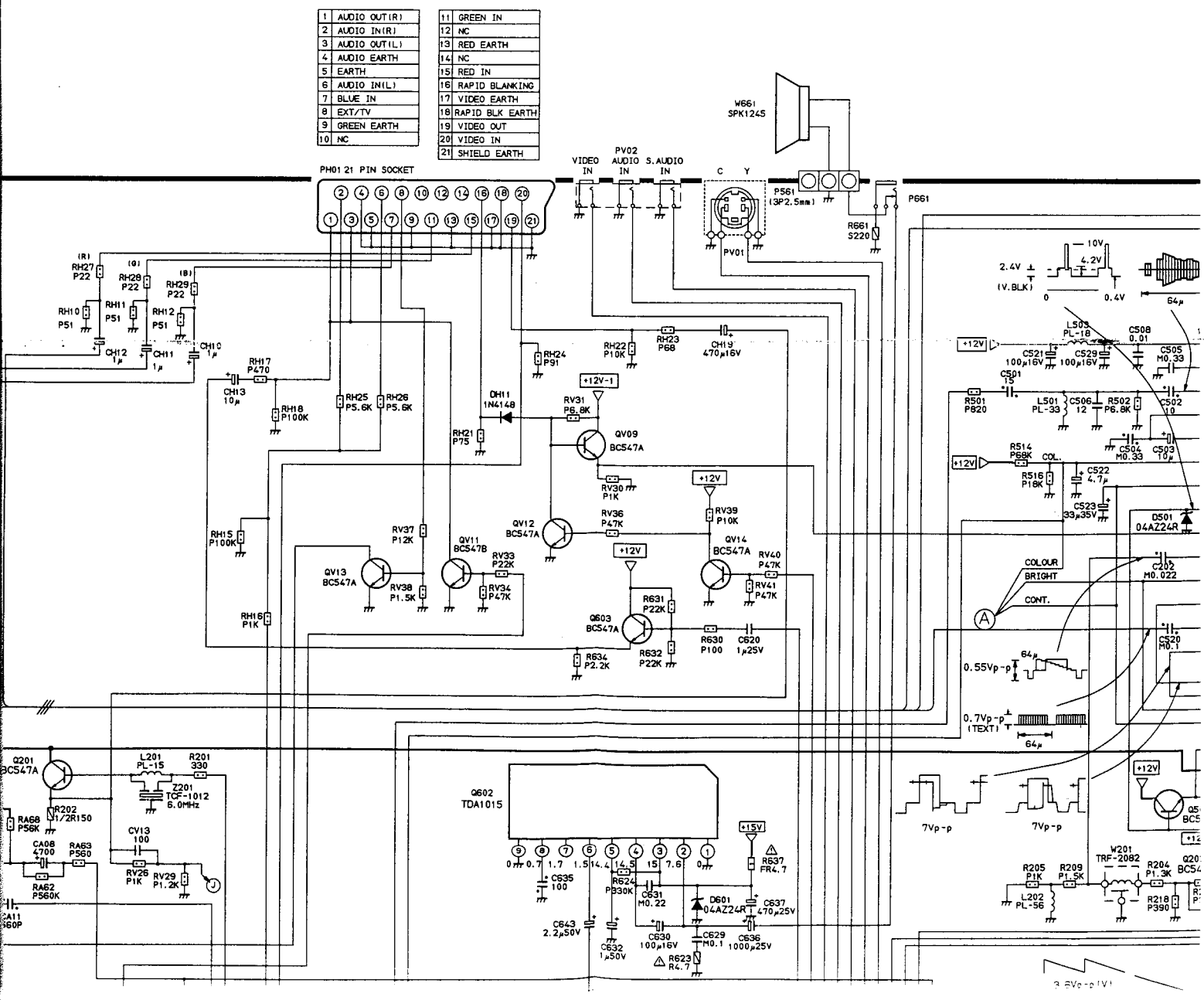
TYPE	MARK
Carbon Comp.	S
Oxide Metal Film	R
Ins. Carbon Film	P
Wire Wound	W
Cement covered W.W.	NO MARK
Fusible Res.	FR

Suffixes to values

TOLERAN
±1%
±2%

Suffixes to VR va

LAW
Linear
'C' Curve Chara



	MARK
	S
	R
	P
	W
	NO MARK
	FR

Suffixes to values:

TOLERANCE	MARK
±1%	(F)
±2%	(G)

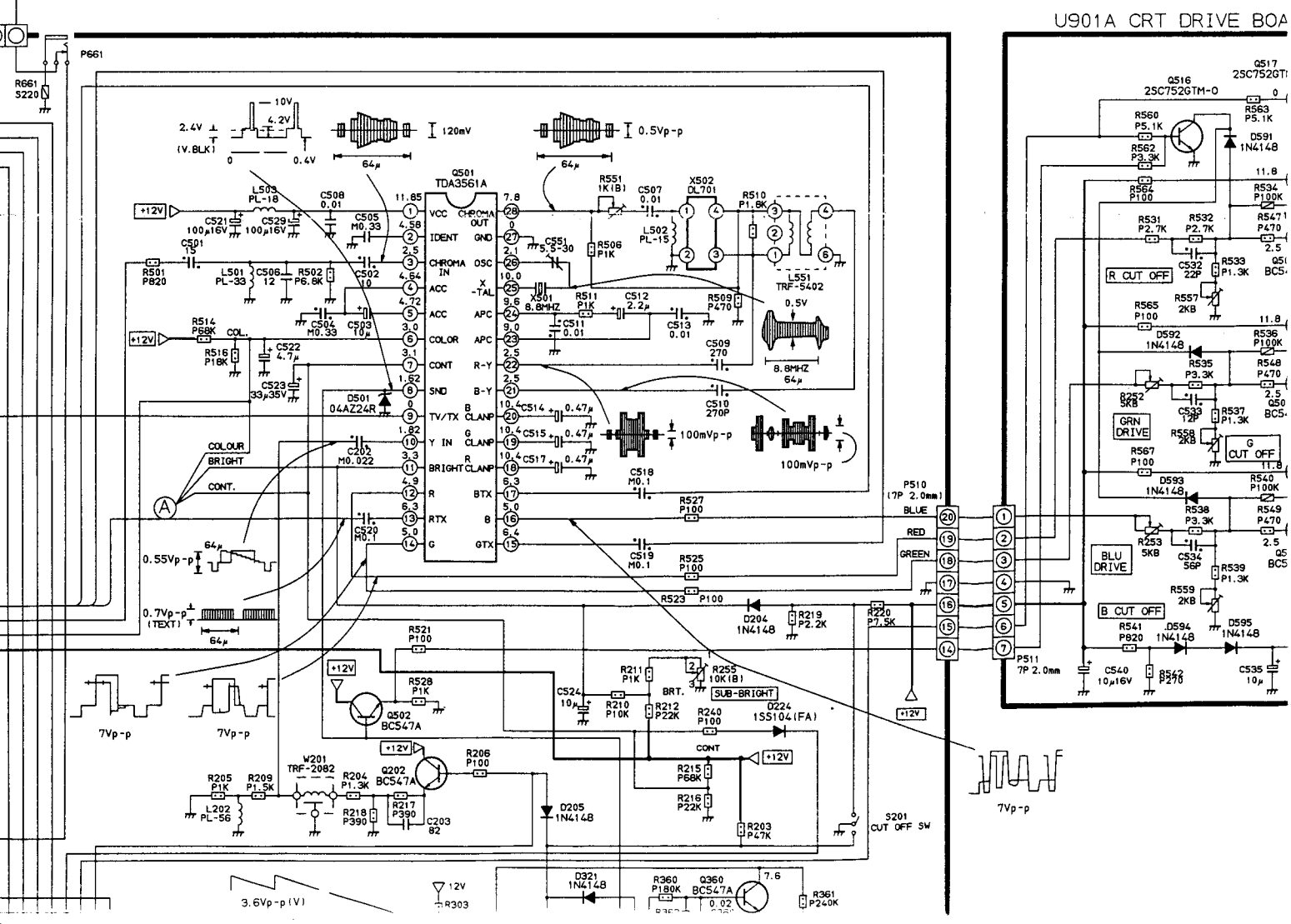
Suffixes to VR values:

LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

Rating Markings:

WATTAGE	MARK
1/6W	
1/4W	
1/2W	
1W	1
2W	2

WATTAGE	MARK
3W	3
5W	5
10W	10
15W	15
20W	20
25W	25

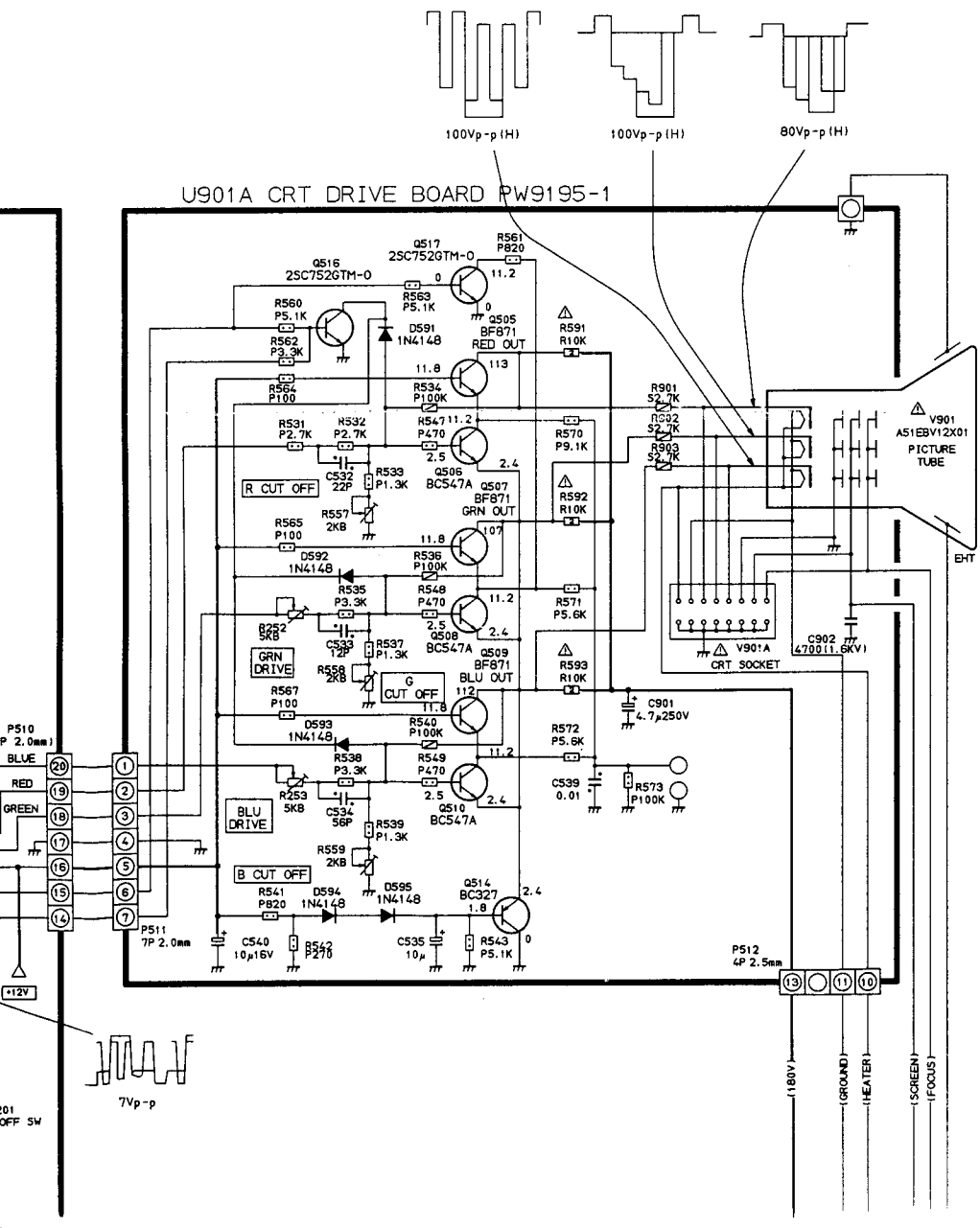


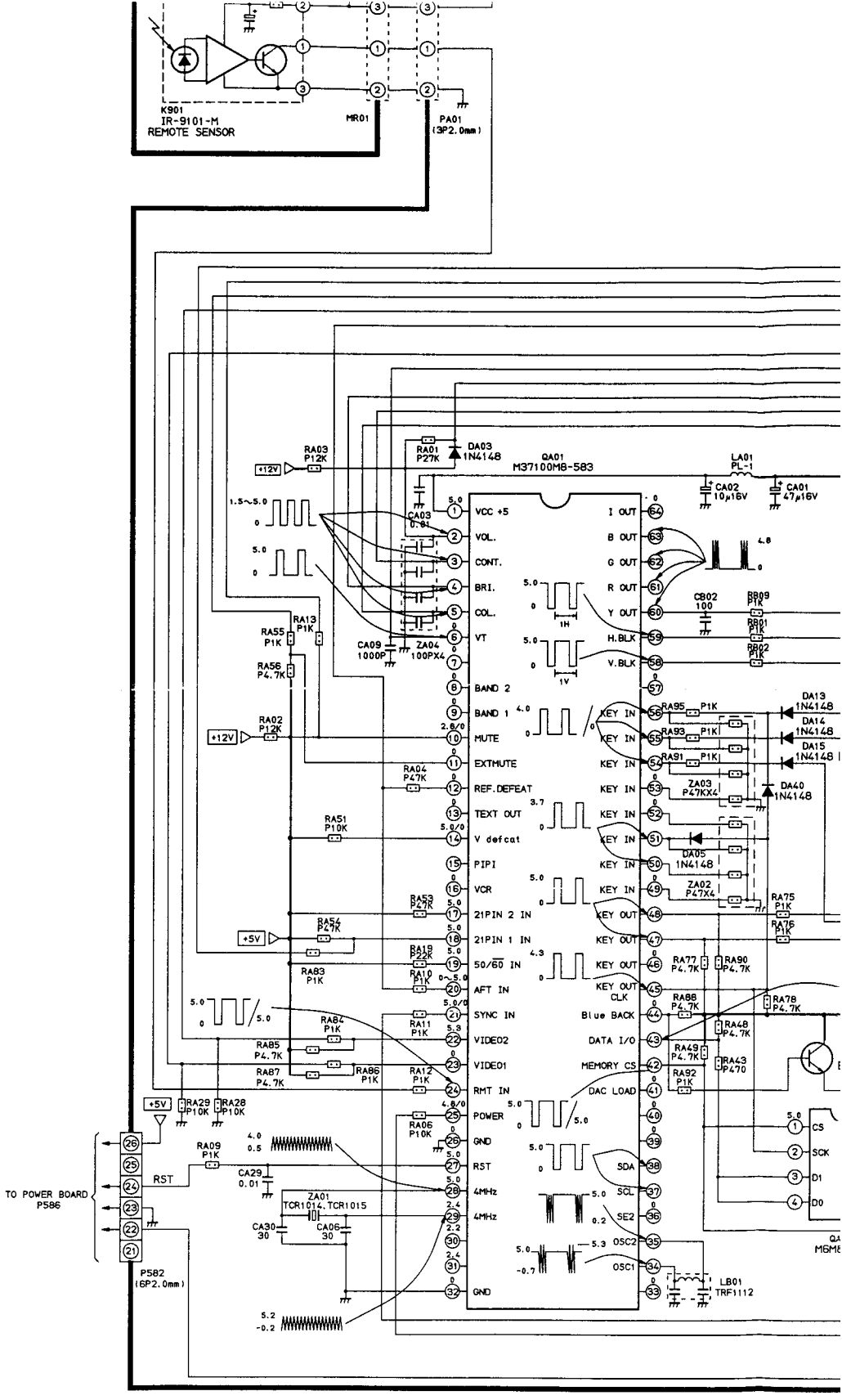
CAPACITORS

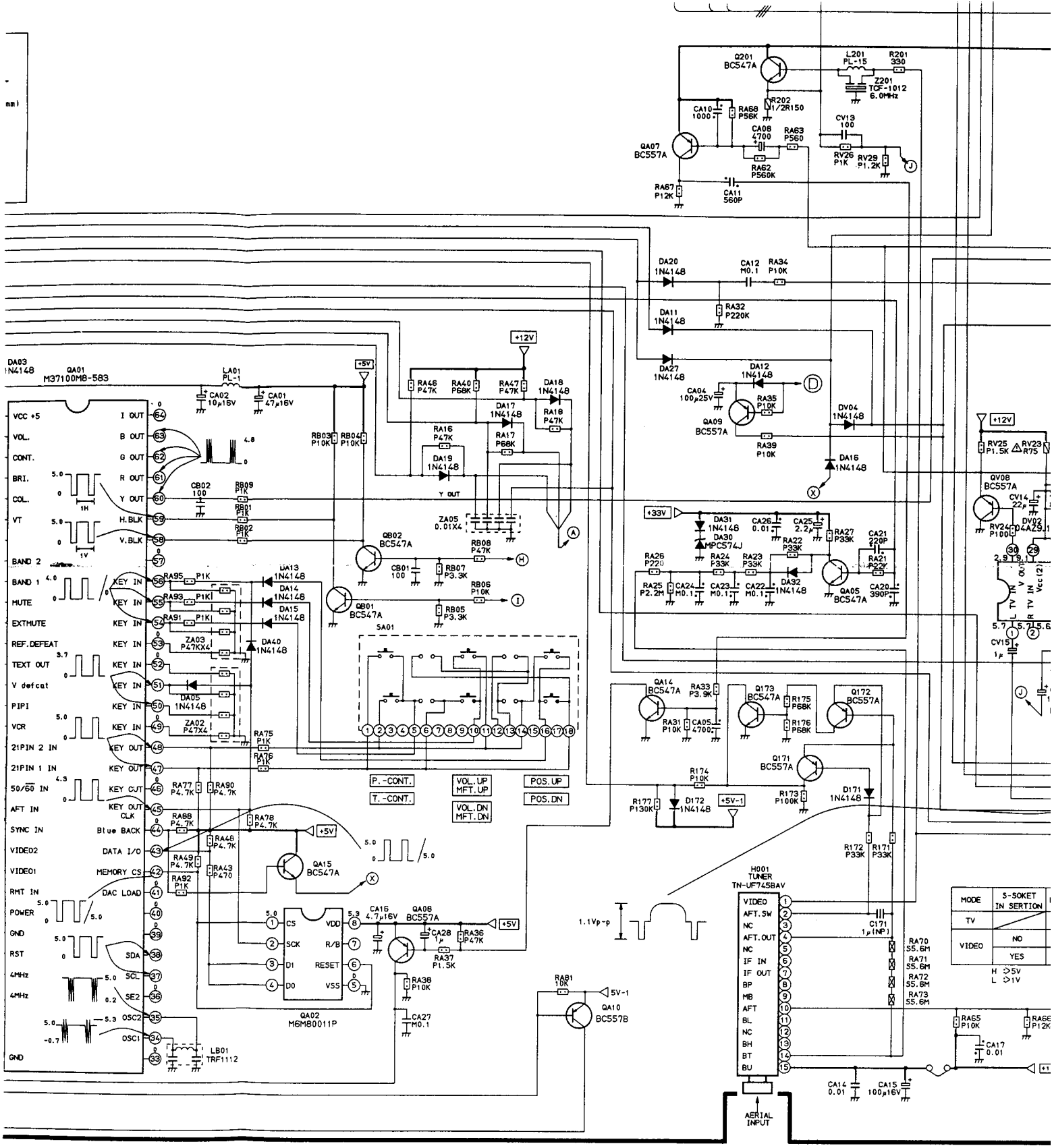
Rating Markings:

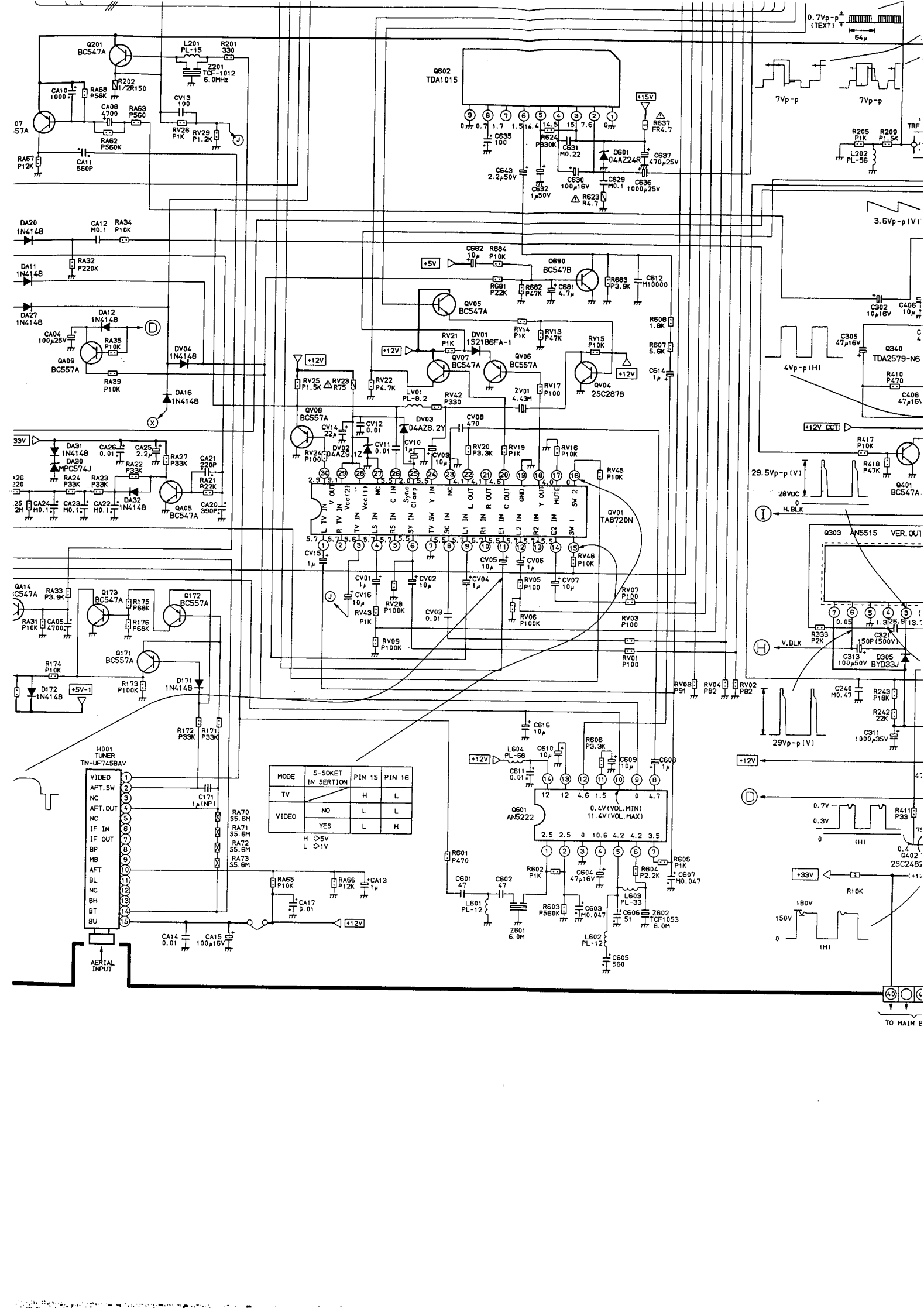
Type	Mark
Ceramic Disc 50V Only	
Electrolytic	
Electrolytic Non-Polar	
Variable Capacitor	
Other	

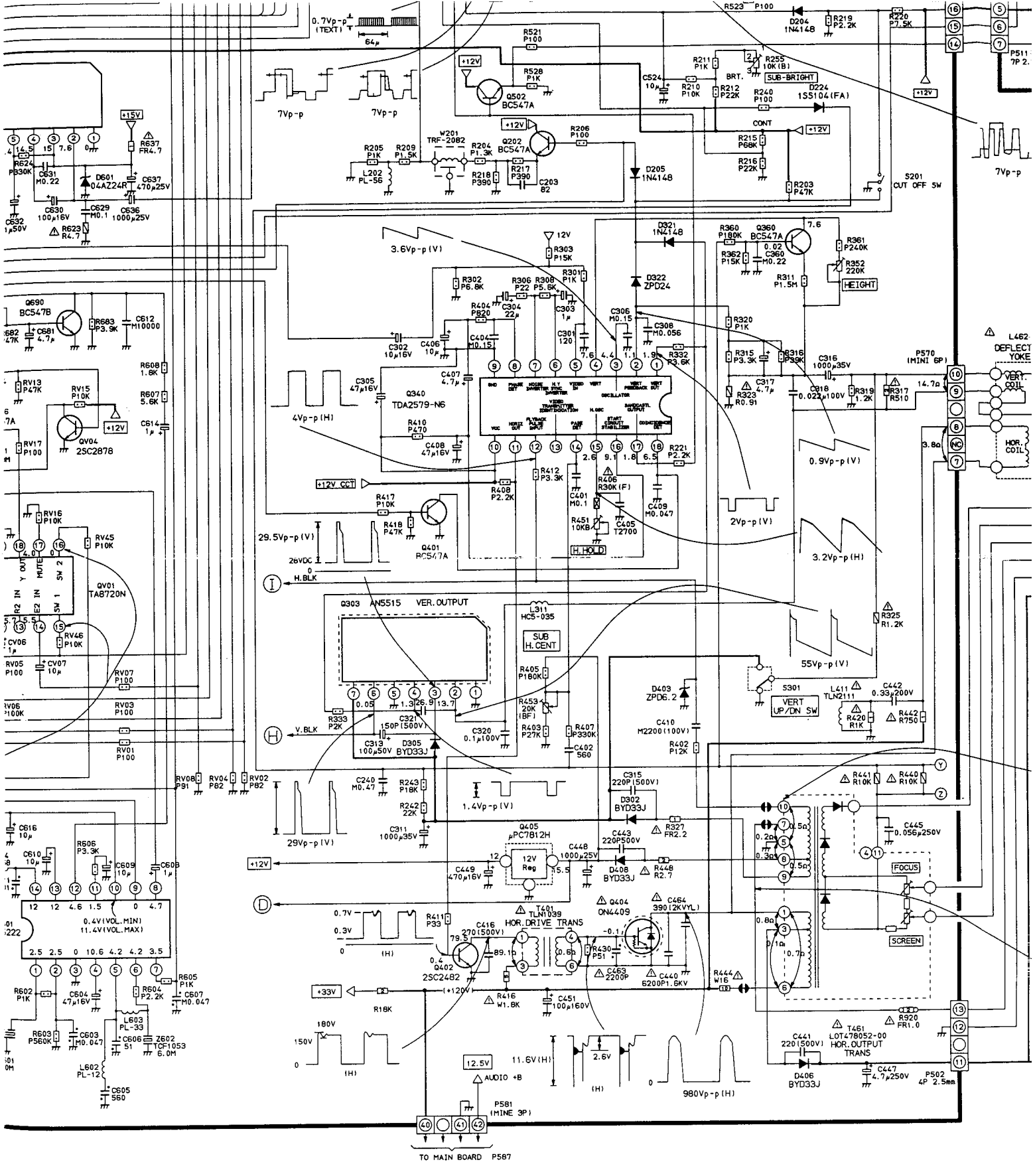
WATTAGE	MARK
3W	3
5W	5
10W	10
15W	15
20W	20
25W	25

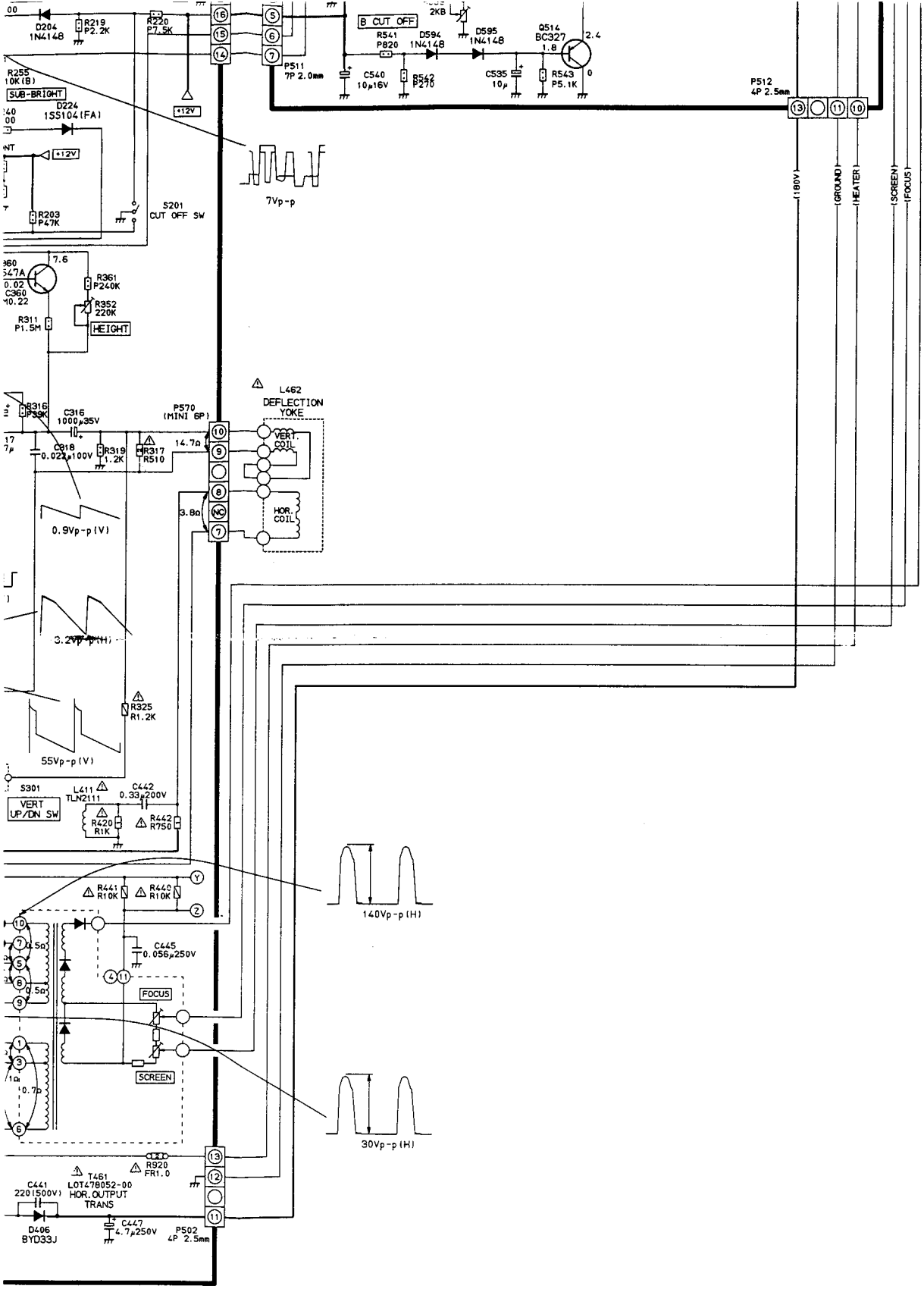



K901
IR-9101-M
REMOTE SENSOR
MR01
PA01
(3P2.0mm)
QA01
M37100M8-583
LA01
PL-1
CA02
10μ16V
CA01
47μ16V
DA03
1N4148
RA03
P12K
RA01
P27K
+12V
CA03
0.01
VCC +5
VOL.
CONT.
BRI.
COL.
VT
BAND 2
BAND 1
MUTE
EXTMUTE
REF.DEFEAT
TEXT OUT
V defeat
PIPI
VCR
21PIN 2 IN
21PIN 1 IN
50/60 IN
AFT IN
SYNC IN
VIDEO2
VIDEO1
RMT IN
POWER
GND
RST
4MHz
4MHz
GND
I OUT
B OUT
G OUT
R OUT
Y OUT
H.BLK
V.BLK
KEY IN
KEY OUT
Blue BACK
DATA I/O
MEMORY CS
DAC LOAD
SDA
SCL
SE2
OSC2
OSC1
CS
SCK
D1
D0
RA13
P1K
RA55
P1K
RA56
P4.7K
CA09
1000P
ZA04
100PX4
RA02
P12K
RA04
P47K
RA51
P10K
RA53
P47K
RA54
P47K
RA19
P22K
RA10
P1K
RA83
P1K
RA84
P1K
RA85
P4.7K
RA87
P4.7K
RA86
P1K
RA12
P1K
RA11
P1K
RA06
P10K
RA09
P1K
CA29
0.01
ZA01
TCR1014.TCR1015
CA30
30
CA06
30
LB01
TRF1112
CB02
100
RB09
P1K
RB01
P1K
RB02
P1K
RA95
P1K
RA93
P1K
RA91
P1K
DA13
1N4148
DA14
1N4148
DA15
1N4148
DA40
1N4148
ZA03
P47KX4
DA05
1N4148
ZA02
P47X4
RA75
P1K
RA76
P1K
RA77
P4.7K
RA90
P4.7K
RA88
P4.7K
RA78
P4.7K
RA48
P4.7K
RA49
P4.7K
RA43
P470
RA92
P1K
+5V
RA29
P10K
RA28
P10K
TO POWER BOARD
P586
P582
(6P2.0mm)


QA01 M37100M8-583
DA03 1N4148
LA01 PL-1
CA02 10μ16V
CA01 47μ16V
VCC +5
VOL.
CONT.
BRI.
COL.
VT
BAND 2
BAND 1
MUTE
EXTMUTE
REF.DEFEAT
TEXT OUT
V defcat
PIPI
VCR
21PIN 2 IN
21PIN 1 IN
50/60 IN
AFT IN
SYNC IN
VIDEO2
VIDEO1
RMT IN
POWER
GND
RST
4MHz
4MHz
GND
I OUT
B OUT
G OUT
R OUT
Y OUT
H.BLK
V.BLK
KEY IN
KEY OUT
KEY CUT
CLK
Blue BACK
DATA I/O
MEMORY CS
DAC LOAD
SDA
SCL
SE2
OSC2
OSC1
LB01 TRF1112
+5V
+12V
+33V
5V-1
Y OUT
QA02 M6M80011P
CS
SCK
DI
DO
VDD
R/B
RESET
VSS
QA15 BC547A
QA08 BC557A
QA10 BC557B
QB01 BC547A
QB02 BC547A
QA09 BC557A
QA05 BC547A
QA14 BC547A
Q173 BC547A
Q172 BC557A
Q171 BC557A
QV08 BC557A
SA01
P.-CONT.
T.-CONT.
VOL.UP MFT.UP
VOL.DN MFT.DN
POS.UP
POS.DN
H001 TUNER TN-UF745BAV
VIDEO
AFT.SW
NC
AFT.OUT
IF IN
IF OUT
BP
MB
AFT
BL
BH
BT
BU
AERIAL INPUT
1.1Vp-p
MODE
S-SOKET IN SERTION
TV
VIDEO
NO
YES
H :5V
L :1V


Q602 TDA1015
QV01 TA8720N
Q303 AN5515 VER. OUT
Q601 AN5222
H001 TUNER TN-UF745BAV
VIDEO
AFT. SW
NC
AFT. OUT
NC
IF IN
IF OUT
BP
MB
AFT
BL
NC
BH
BT
BU
AERIAL INPUT
MODE
S-SOKET IN SERTION
PIN 15
PIN 16
TV
VIDEO
NO
YES
H :>5V
L :>1V
+15V
+12V
+5V
+33V
+5V-1
+12V CCT
H.BLK
V.BLK
TO MAIN B


Q690 BC547B
Q340 TDA2579-N6
QV04 2SC2878
QV01 TA8720N
Q303 AN5515 VER. OUTPUT
Q401 BC547A
Q502 BC547A
Q202 BC547A
Q360 BC547A
Q405 μPC7812H
Q404 DN4409
Q402 2SC2482
D601 04AZ24R
D204 1N4148
D205 1N4148
D321 1N4148
D322 ZPD24
D224 1S5104(FA)
D403 ZPD6.2
D302 BYD33J
D305 BYD33J
D408 BYD33J
D406 BYD33J
T401 TLN1039 HOR. DRIVE TRANS
T461 LOT478052-00 HOR. OUTPUT TRANS
L311 HC5-035
L411 TLN2111
L202 PL-56
L602 PL-12
L603 PL-33
W201 TRF-2082
S201 CUT OFF SW
S301 VERT UP/DN SW
SUB-BRIGHT
SUB H. CENT
HEIGHT
H. HOLD
FOCUS
SCREEN
DEFLECT YOKE
VERT. COIL
HOR. COIL
P570 (MINI 6P)
P581 (MINE 3P)
P502 4P 2.5mm
TO MAIN BOARD P587
+15V
+12V
+12V CCT
+33V
12V Reg
12.5V AUDIO +B
7Vp-p
3.6Vp-p(V)
4Vp-p(H)
29.5Vp-p(V)
0.9Vp-p(V)
2Vp-p(V)
3.2Vp-p(H)
55Vp-p(V)
1.4Vp-p(V)
29Vp-p(V)
980Vp-p(H)
11.6V(H)
V.BLK
H.BLK


D204 1N4148
R219 P2.2K
R220 P7.5K
P511 7P 2.0mm
B CUT OFF
R541 P820
D594 1N4148
D595 1N4148
Q514 BC327
C540 10μ16V
B542 P270
C535 10μ
R543 P5.1K
P512 4P 2.5mm
(180V)
(GROUND)
(HEATER)
(SCREEN)
(FOCUS)
R255 10K(B)
SUB-BRIGHT
D224 1SS104(FA)
+12V
R203 P47K
S201 CUT OFF SW
7Vp-p
R361 P240K
R352 220K
HEIGHT
R311 P1.5M
L462 DEFLECTION YOKE
P570 (MINI 6P)
C316 1000μ35V
C818 0.022μ100V
R319 1.2K
R317 R510
14.7Ω
VERT. COIL
HOR. COIL
3.8Ω
0.9Vp-p(V)
3.2Vp-p(H)
R325 R1.2K
55Vp-p(V)
S301 VERT UP/DN SW
L411 TLN2111
C442 0.33μ200V
R420 R1K
R442 R750
R441 R10K
R440 R10K
140Vp-p(H)
C445 0.056μ250V
FOCUS
SCREEN
30Vp-p(H)
R920 FR1.0
T461 LOT478052-00 HOR.OUTPUT TRANS
C441 2201500V
C447 4.7μ250V
D406 BYD33J
P502 4P 2.5mm

219R9B

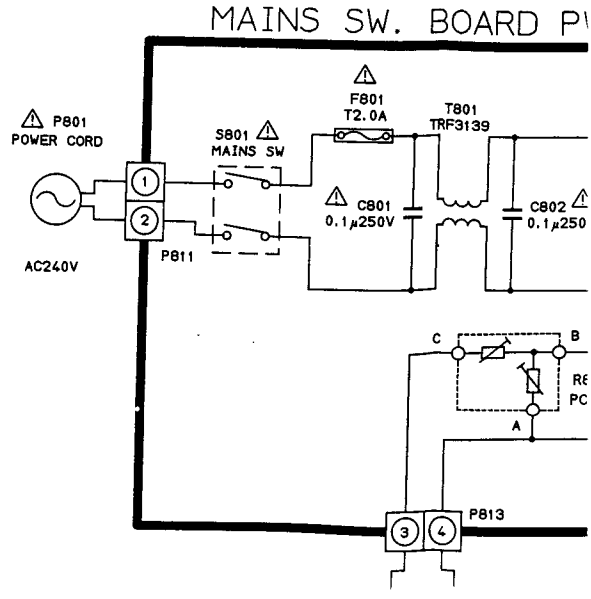
SCHEMATIC DIAGRAM (2/2)

IMPORTANT SAFETY NOTICE

Component marked with the International Hazard Symbol mu
approved type and must be mounted as the original. This will
adhered to during manufacture will be maintained following a

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltage readings were obtained using a high impedance c
2. (—) or ground lead of instruments should be connected
   shematic on checking Non-isolated circuit surrounded b
   to the points marked (⏚) on checking isolated circuit.
3. The voltage readings may vary as much as ±20%.
4. Check that the Tuning, A.F.C., Brightness, Contrast and
   the best picture, making sure that the Contrast, Brightı
   near to their mid-positions.
5. The waveforms were taken using a standard colour bar
   wide band oscilloscope via a low capacity probe.



IT SAFETY NOTICE

marked with the International Hazard Symbol must, if changed, be replaced by an
be and must be mounted as the original. This will ensure that the safety standards
during manufacture will be maintained following any servicing procedure.

TION OF VOLTAGES AND WAVEFORMS

readings were obtained using a high impedance digital voltmeter.
ground lead of instruments should be connected to the ground marked (⊥) in the
c on checking Non-isolated circuit surrounded by mark but should be connected
oints marked (⏚) on checking isolated circuit.
tage readings may vary as much as ±20%.
hat the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for
t picture, making sure that the Contrast, Brightness and Colour controls are set
their mid-positions.
veforms were taken using a standard colour bar signal and were observed using a
nd oscilloscope via a low capacity probe.

NOTES:

1. This circuit diagram is subject to change without notice.

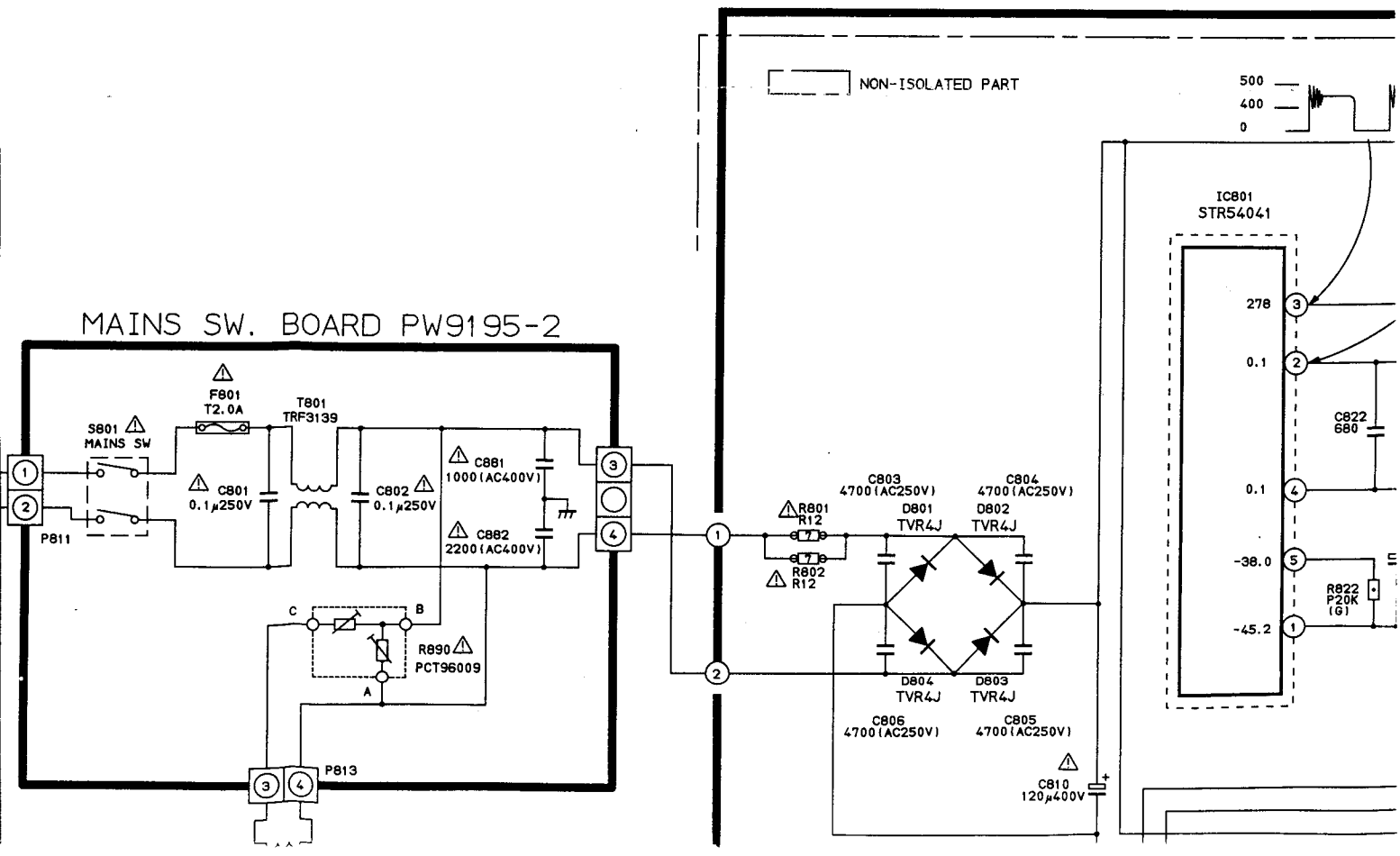
EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless otherwise noted in schematic, all capacitor values less t
   μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more t
   μH, and the values less than 1 in H.

GROUNDING SYMBOL

1. ⊥: Non isolated ground, ⏚ : Isolated ground.



ES:

is circuit diagram is subject to change without notice.

SION

F RESISTOR, CAPACITOR and INDUCTOR

nce is shown in ohm, k=1,000, M=1,000,000.
otherwise noted in schematic, all capacitor values less than 1 are expressed in
the values more than 1 in pF.
otherwise noted in schematic, all inductor values more than 1 are expressed in
d the values less than 1 in H.

NG SYMBOL

isolated ground, ⏚ : Isolated ground.

RESISTORS

Prefixed to values:

TYPE	MARK
Carbon Comp.	S
Oxide Metal Film	R
Ins. Carbon Film	P
Wire Wound	W
Cement covered W.W.	NO MARK
Fusible Res.	FR

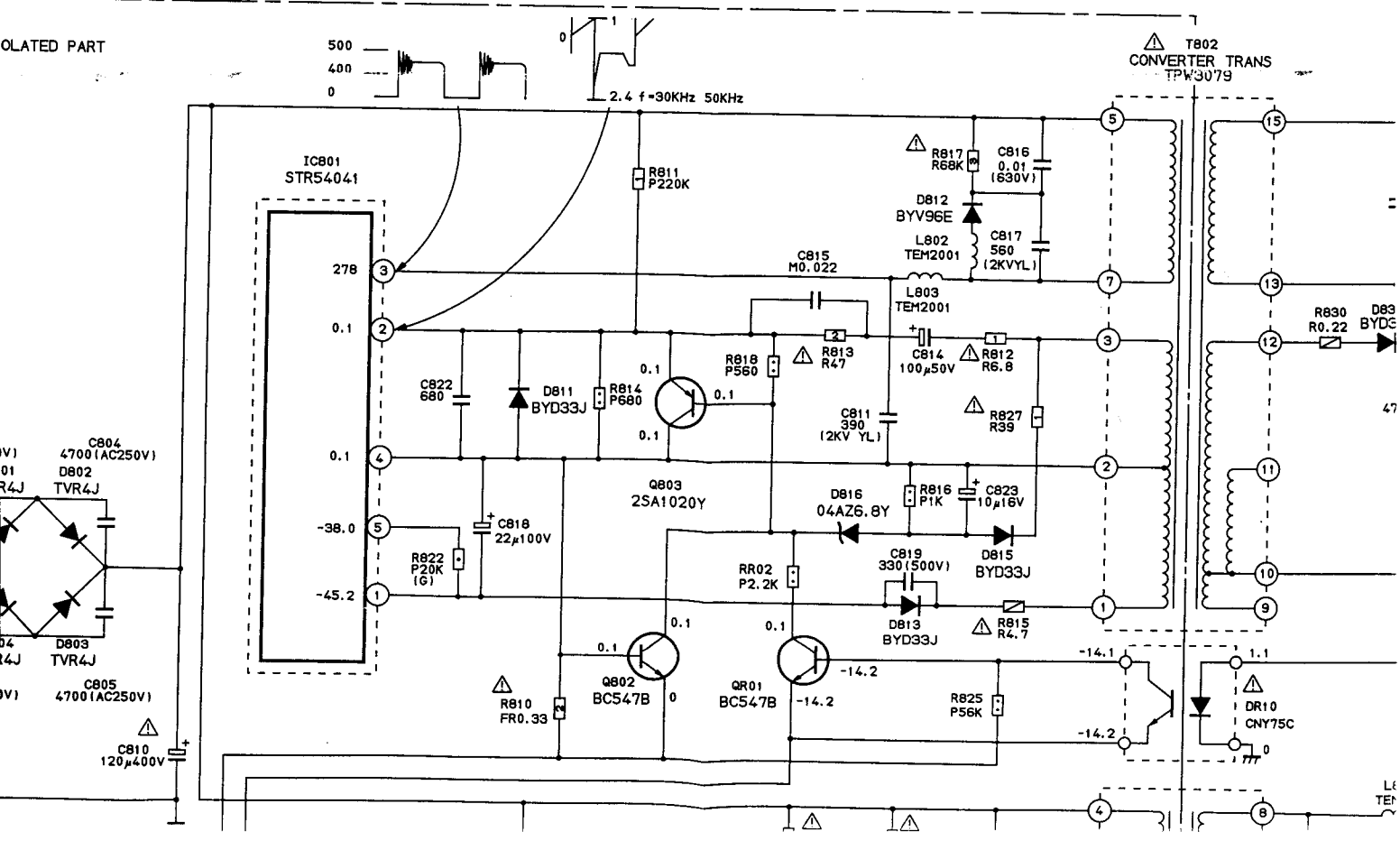
Suffixes to

TOL

Suffixes to

'C' Curve

U801 POWER BOARD PW9207



	MARK
	S
	R
	P
	W
W.	NO MARK
	FR

Suffixes to values:

TOLERANCE	MARK
±1%	(F)
±2%	(G)

Suffixes to VR values:

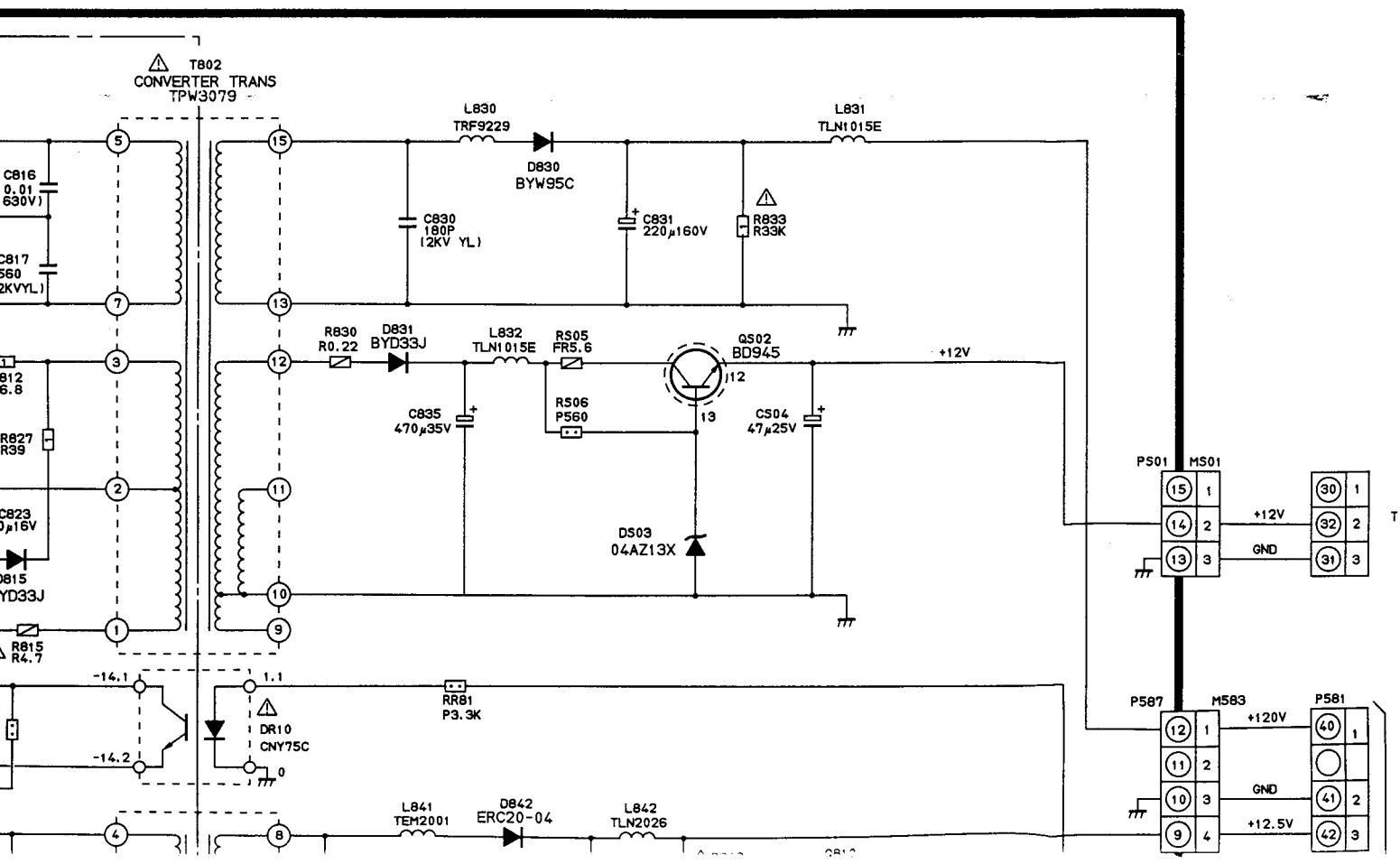
LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

Rating Markings:

WATTAGE	MARK
1/6W	
1/4W	
1/2W	
1W	1
2W	2

WATTAGE	MARK
3W	3
5W	5
10W	10
15W	15
20W	20
25W	25

ARD PW9207



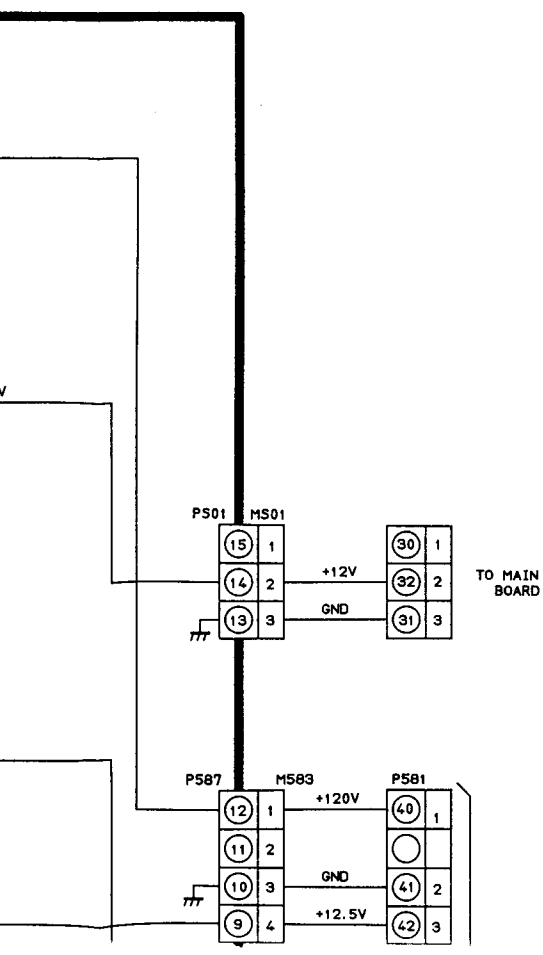
RK

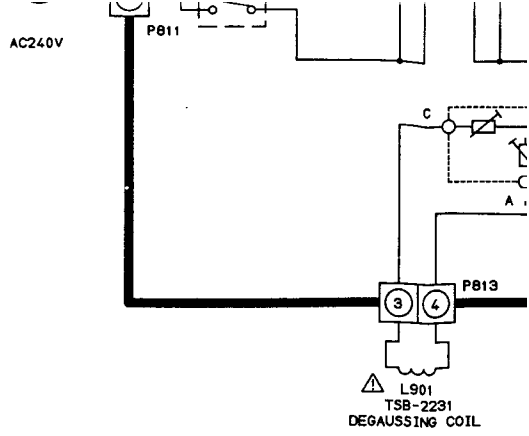
WATTAGE	MARK
3W	3
5W	5
10W	10
15W	15
20W	20
25W	25

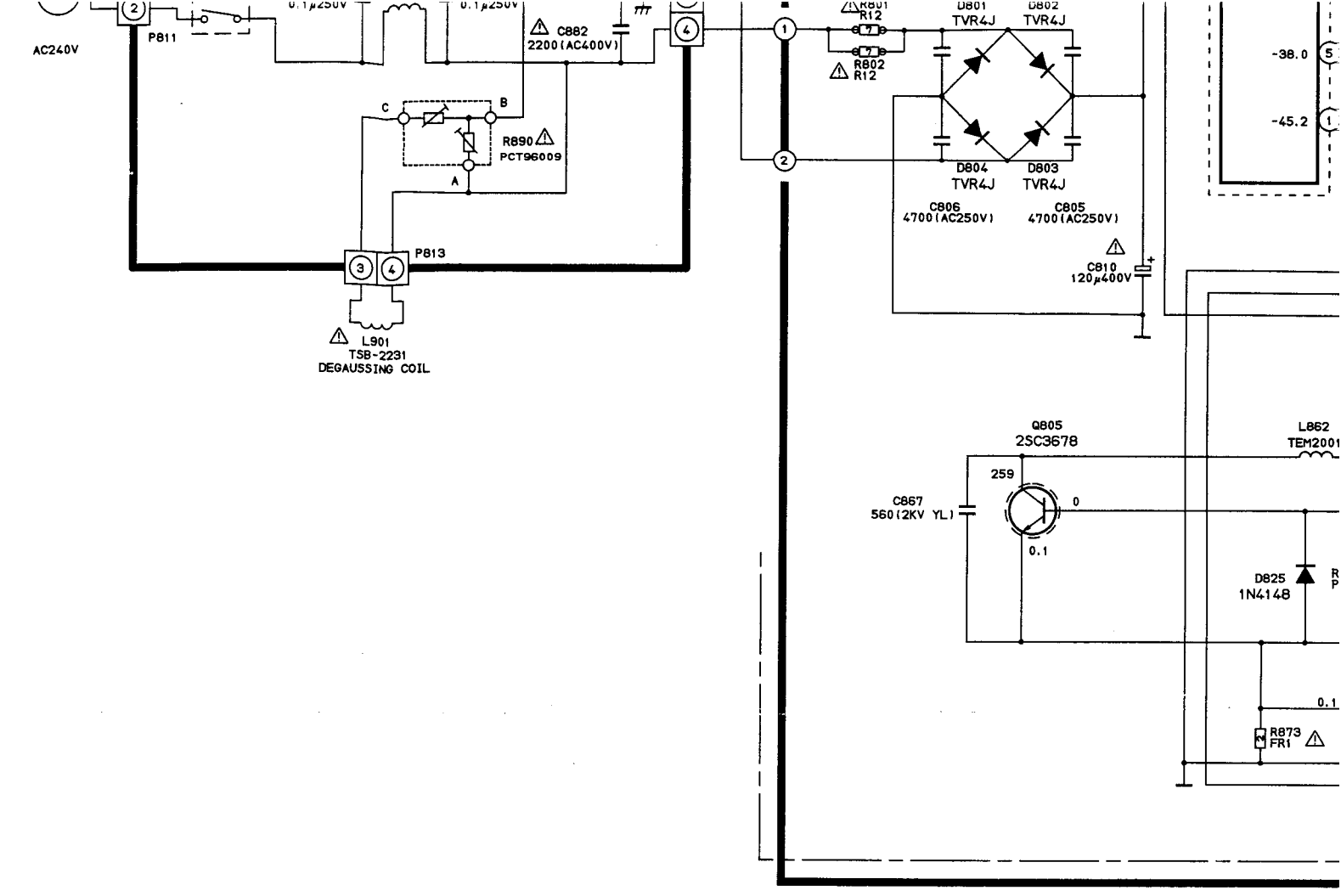
CAPACITORS

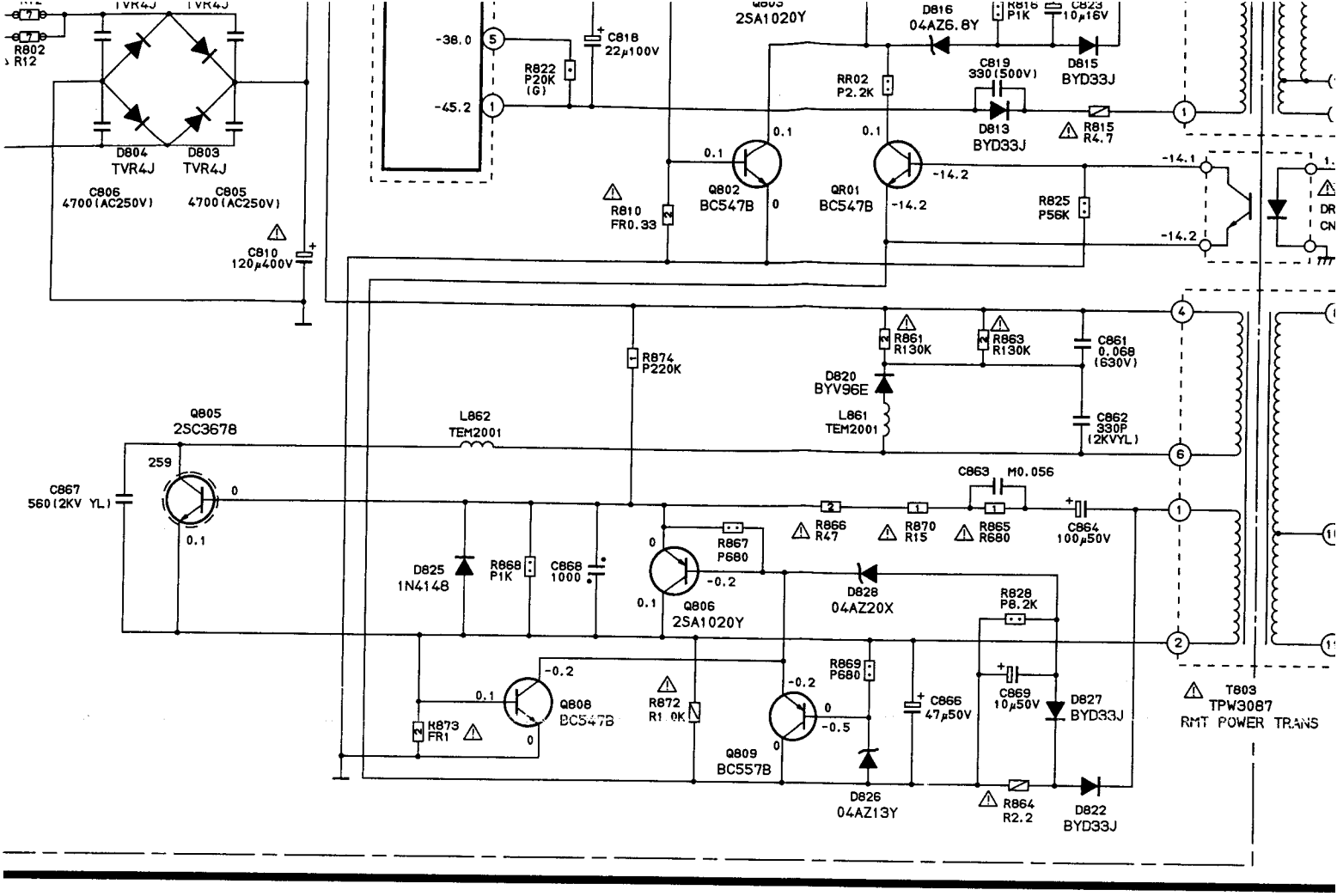
Rating Markings:

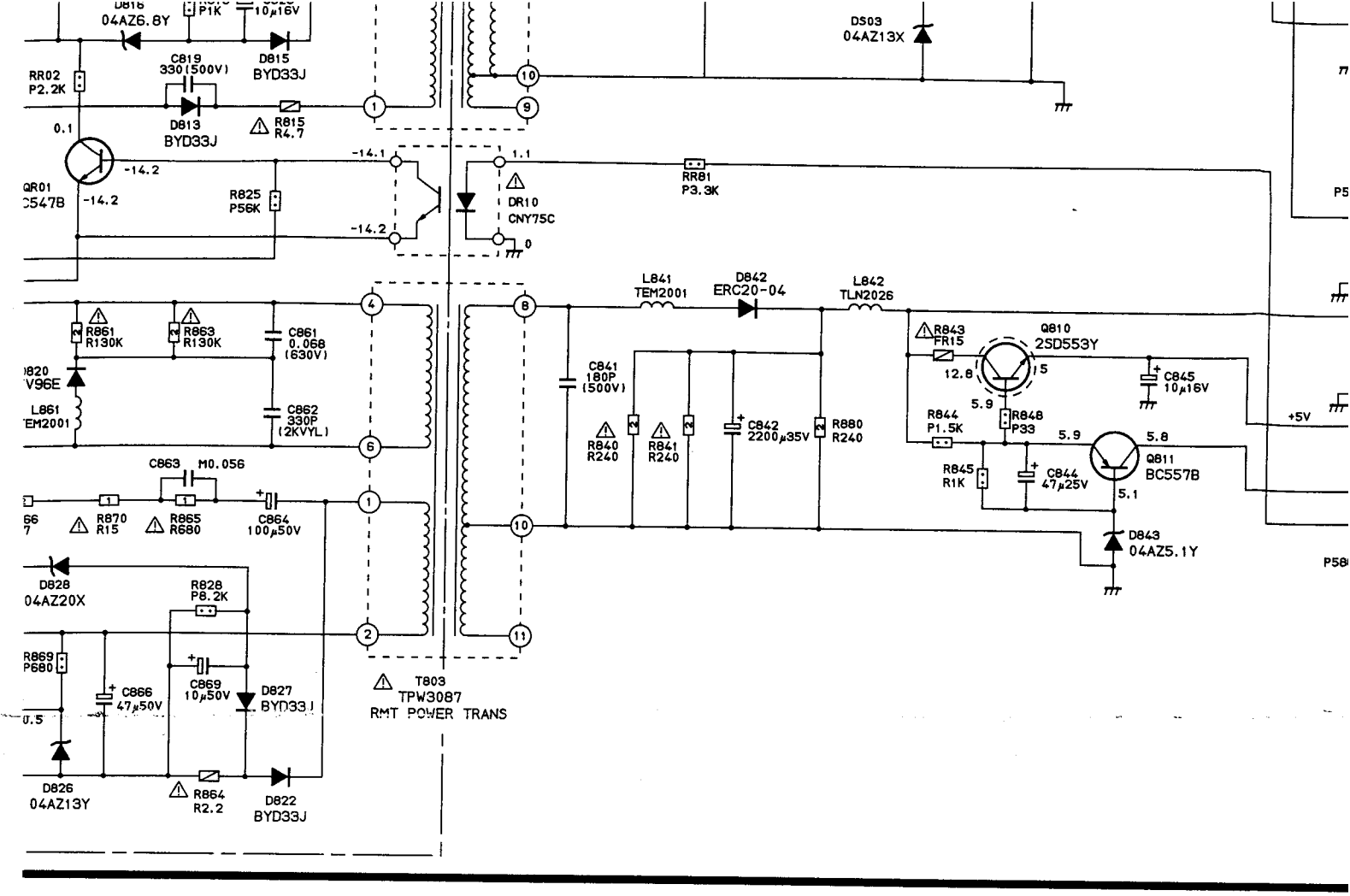
Type	Mark
Ceramic Disc 50V Only	
Electrolytic	
Electrolytic Non-Polar	
Variable Capacitor	
Other	




AC240V
P811
C
P813
3
4
L901
TSB-2231
DEGAUSSING COIL


AC240V
P811
C882
2200(AC400V)
R890
PCT96009
P813
L901
TSB-2231
DEGAUSSING COIL
R801
R12
R802
R12
D801
TVR4J
D802
TVR4J
D804
TVR4J
D803
TVR4J
C806
4700(AC250V)
C805
4700(AC250V)
C810
120μ400V
-38.0
-45.2
Q805
2SC3678
259
0
0.1
C867
560(2KV YL)
D825
1N4148
R873
FR1
L862
TEM2001


R802
R12
D804
TVR4J
D803
TVR4J
C806
4700(AC250V)
C805
4700(AC250V)
C810
120μ400V
-38.0
-45.2
R822
P20K
(G)
C818
22μ100V
2SA1020Y
D816
04AZ6.8Y
R816
P1K
C823
10μ16V
D815
BYD33J
RR02
P2.2K
C819
330(500V)
D813
BYD33J
R815
R4.7
R810
FR0.33
Q802
BC547B
QR01
BC547B
R825
P56K
R874
P220K
R861
R130K
R863
R130K
C861
0.068
(630V)
D820
BYV96E
L861
TEM2001
C862
330P
(2KVYL)
Q805
2SC3678
L862
TEM2001
C867
560(2KV YL)
C863
M0.056
R866
R47
R870
R15
R865
R680
C864
100μ50V
R867
P680
D825
1N4148
R868
P1K
C868
1000
Q806
2SA1020Y
D828
04AZ20X
R828
P8.2K
R869
P680
C866
47μ50V
C869
10μ50V
D827
BYD33J
R873
FR1
Q808
BC547B
R872
R1.0K
Q809
BC557B
D826
04AZ13Y
R864
R2.2
D822
BYD33J
T803
TPW3087
RMT POWER TRANS


D816
04AZ6.8Y
P1K
10μ16V
C819
330(500V)
D815
BYD33J
RR02
P2.2K
D813
BYD33J
R815
R4.7
0.1
-14.2
QR01
C547B
-14.2
R825
P56K
-14.1
-14.2
DR10
CNY75C
RR81
P3.3K
DS03
04AZ13X
L841
TEM2001
D842
ERC20-04
L842
TLN2026
R861
R130K
R863
R130K
C861
0.068
(630V)
C862
330P
(2KVYL)
L861
TEM2001
C841
180P
(500V)
R840
R240
R841
R240
C842
2200μ35V
R880
R240
R843
FR15
Q810
2SD553Y
12.8
5.9
C845
10μ16V
R844
P1.5K
R848
P33
5.9
5.8
Q811
BC557B
5.1
R845
R1K
C844
47μ25V
D843
04AZ5.1Y
+5V
C863
M0.056
R870
R15
R865
R680
C864
100μ50V
D828
04AZ20X
R828
P8.2K
R869
P680
C866
47μ50V
C869
10μ50V
D827
BYD33J
D826
04AZ13Y
R864
R2.2
D822
BYD33J
T803
TPW3087
RMT POWER TRANS